



SATURDAY, MAY 29, 1875.

MASTER MECHANICS' ASSOCIATION.

Proceedings of the Eighth Annual Convention.

WEDNESDAY'S SESSION.

CONTINUATION OF DISCUSSION ON BOILERS.

[An abstract of the report on boilers was published in the Railroad Gazette of May 15; the first and longest part of the discussion on the report in the number for May 22.]

Mr. SETCHEL (Little Miami) moved that members be recommended to try corrugation as a remedy for cracking.

Mr. COLEMAN SELLERS said his object was to get at the sense of the Convention.

Mr. GRAHAM (Lackawanna & Bloomsburg) had had much experience with corrugated sheets. The corrugating was a very simple matter and would not cost \$5 for a furnace. It was done in the rolls, with a top roller and two lower ones. By screwing down the top roll and slackening it up, alternately, they could pass the sheet through. A sheet could be done in an hour. After it had been corrugated across the whole sheet they simply straightened the edges of the sheet while red-hot. The center line of corrugation is about  $\frac{3}{4}$  inch; there is a little more thickness of the iron on each side of the center line. They kept the edge of the iron in the center line of corrugation and brought the row of stay-bolts on top. He had used such sheets six years, with good results, and there was little trouble or expense in doing it.

Mr. CHAPMAN (Cleveland & Pittsburgh) thought they had better be a little slow and leave it to members to act as they saw fit. He understood that there were several parties claiming patents on corrugated sheets. He did not wish to imply that Mr. Setchel was one of them.

Mr. GRAHAM said he was not aware of any patent, though parties had applied, including one man who got it from him. He himself had applied for a patent, and had models made, but was told it was not patentable.

Mr. CHAPMAN thought that there was a gentleman in Chicago who claimed a patent.

Mr. GRAHAM said that he applied for one, but the application was rejected.

Mr. SELLERS said it was a very old device and not patentable.

Mr. SETCHEL said he would divide with the Vice-President, if he was lucky enough to get anything.

Mr. BROOKS (Brooks Locomotive Works) seconded the motion, to get at the sense of the meeting.

Mr. HOWARD FAY (Philadelphia & Erie) asked if the acceptance of the motion committed the Convention to an approval of corrugated sheets, or if it merely recommended their trial.

Mr. SELLERS said that his object was not to commit the Association, but to get the sense of the meeting as to whether any change of form would be likely to obviate this trouble. It simply recommended a trial.

Mr. CHAPMAN said he understood that it recommended the members to try it.

Mr. SETCHEL said that was the motion.

Mr. CHAPMAN thought it would commit the members to try it. If he voted for it, he should feel bound to try it.

Mr. FORNEY (Railroad Gazette) would like to amend by adding "if they choose."

Mr. SETCHEL thought that was implied.

Mr. FLYNN (Western & Atlantic) differed with Mr. Setchel, and thought the motion was that the Association recommend corrugated side sheets.

Mr. SETCHEL said it only recommended their trial as a remedy.

Mr. FLYNN said if that was the case he should vote for it. They had only the experience of one member with corrugated sheets. He was in favor of it and thought it would meet many difficulties arising from cracking.

Mr. PHILLBRICK (Maine Central) understood that the corrugation was intended to counteract the expansion and contraction. There is contraction downward as well as lengthwise, and that contraction sometimes breaks the stay-bars. Should the sheets be corrugated both ways to remedy that?

Mr. SETCHEL supposed that matter was understood. The Committee reported no cases of sheets cracking longitudinally; they were all up and down, or sometimes zigzag cracks. His idea was that something should be done, and it was best to recommend some plan that seemed feasible. There was an undue strain, and if they mitigated it or prevented it entirely the result was worth an effort. The idea of the motion was to express an opinion that corrugation was at least worth a trial.

Mr. WELLS (Jeffersonville, Madison & Indianapolis) thought that if any member believed it worth while, he would make the trial without the resolution.

Mr. FAY would like to amend by adding "That, looking at the great importance of the introduction of steel in locomotive boilers, the Association requests the members to make such alterations in the form of fire-boxes as may seem to them, from the facts laid before them during this Convention, most likely to obviate the cracking of steel plates and other defects which have shown themselves." This would leave members to do as they saw fit.

Mr. CHAPMAN thought they would do it without a resolution.

Mr. FAY thought many of them were in such a position that they needed something to help them and give them weight in laying their opinions before the officers of their roads. He did not want to disparage their position, but he thought they sometimes needed something to strengthen them in proposing a change. He thought it would add to the weight of the Association to bring the opinions expressed in Convention to the notice of their officers.

Mr. LAUDER (Northern of New Hampshire) thought the amendment had better be put as a substitute.

Mr. ROBINSON (Great Western of Canada) thought it would be more acceptable to members to recommend them to devote their attention to changes in the shape of boilers as a remedy for the cracking of sheets.

Mr. FAY accepted this as a substitute, or would accept any other suggestion.

Mr. ROBINSON suggested this resolution: "That this Association recommend to its members that they turn their attention during the next 12 months to the advantage to be gained by an alteration in the shape of the plates as a remedy to overcome the difficulties experienced in the use of steel plates."

Mr. SETCHEL withdrew his resolution and accepted Mr. Robinson's, though he said he could not see any difference.

Mr. Robinson's resolution was then adopted, and the discussion was closed.

On recommendation of the PRESIDENT it was moved and carried that the Convention adjourn at 1:30 and hold a second session, beginning at 3 p. m.

On motion of Mr. HAYES the Committee to witness the tests of axles was ordered to be increased to 10 members.

The PRESIDENT then appointed Messrs. Fry, Richards, Wallace, Philbrick, Clark and Garfield, in addition to the four original members, Messrs. Hayes, Sellers, Nott and Forney.

DISCUSSION ON LOCOMOTIVE CONSTRUCTION.

The Convention then resolved to take up for discussion the report of the Committee on Locomotive Construction.

Mr. BROOKS (Brooks Locomotive Works), after some preliminary talk as to the report had been had, said that with reference to the Roberts cylinder it was hardly a question for discussion, but only for information. He was not prepared to recommend it at present, but it developed some new features. Its object was to exhaust at a positive point of the stroke. The link motion let go of the steam before they desired it.

In this exhaust chamber the cylinder is made twice the length of the stroke, in addition to the usual clearance. The piston is made as long as the stroke minus the length of the circumferential exhaust opening, made by a double-headed piston on the rod. The rod extends so as to put two pistons on it. Therefore, when a piston gets within three-fourths of an inch of the end of the stroke, it exhausts into the circumferential exhaust chamber. It gives the entire circumference of the cylinder for the exhaust. The inside lap of the valve is made the same as the outside lap in order to retain the central exhaust, otherwise there would be no benefit from it. Of course there would be no difficulty at full stroke, but on a short cut-off, with that inside lap—1-10 of an inch, cutting off at seven inches on a 24-inch stroke—we let go at 14 inches, or under that. The benefit to be derived from this matter lay in two directions, if at all. He was not prepared to say there was a positive improvement.

It gave results that might be productive of improvement, when we got over difficulties arising from the details. Of course there were some difficulties. The first piston they made weighed 400 pounds. Another piston they made weighed only 30 pounds more than their standard piston. He had mentioned in his letter to the Committee some difficulties that presented themselves to him with regard to the compression. There seemed to him to be two difficulties, one the counterbalancing of the distorting forces, the other the immense compression obtained. But they proved not to be the real trouble. The engine could run at a very high speed and, with the 400-pound piston, was the steadiest driving engine he had ever seen. He attributed the fact of this compression to be determined by the fact that they did not take into consideration the force expended in stopping the thing. It takes just as much force, in total quantity, to stop it as to start it.

This engine, while it might not produce any permanent improvement, was certainly an improvement in one direction; it got rid of the steam positively. With it they could use a smaller valve, and every master mechanic knew the evils arising from the enlargement of valves. He thought the matter deserved attention, but it was not time for them to experiment with it yet.

They had an engine running on the Lake Shore road with a cylinder having a 16-inch port. The inventor insisted on a larger port, though he told him that if his invention was worth anything it was to diminish the size of the valve. They did not want the exhaust at all, except for reversing, and then only for an instant. In this present cylinder instead of the port being cut open, as in the other, the circumferential line had been drilled out with  $\frac{1}{2}$ -inch holes,  $\frac{1}{2}$  inch apart, so as to allow the use of segmental packing. To give them some idea of the quality of the exhaust, they had started this engine with  $\frac{3}{4}$ -inch exhaust, two exhaust pipes, each  $\frac{3}{4}$  inches at the nozzle, and a 16-inch cylinder. That exhaust was so positive, so abrupt that after trying various sizes they reached  $\frac{1}{2}$ -inch nozzles, and then the exhaust was so positive it would lift the fire right off the grates. Any one could distinguish that engine with his eyes shut, just by the exhaust. To overcome this they enlarged the cylinder of the smoke-stack to 20 inches at bottom and 22 inches at top, which diminished very much the velocity of the entering draft. The results noted in the report were obtained from another engine that had been out of the shop many months and had not had the flues removed. It was not a fair comparison. He was not personally interested in this matter, except from a desire to see any improvement in the working of steam. If we can get rid of the steam abruptly after holding it until close to the end of the stroke, it will certainly be a great improvement.

Mr. FRY said that the Committee did not wish to say anything about new patents, but they had given Mr. Brooks' letter with their report because it was the only improvement that had been made with anything approaching success since the introduction of the link motion.

Mr. SELLERS asked Mr. Brooks if he had taken out any cars with that engine yet.

Mr. BROOKS said they had not got to that point yet. He promised that if he lived a year the matter would either be unworthy of notice or there would be positive data as to its working and its utility presented.

REPORT ON SIGNALS.

The discussion was then closed and the Report of the Committee on the Best System of Signals for Operating Railroads (a summary of which appeared in the Railroad Gazette of May 15) was read, and the Convention adjourned.

DISCUSSION ON PURIFICATION OF FEEDWATER.

[This discussion was held early in Wednesday morning's session, and was omitted in our report last week in order to prevent an interruption of the discussion on boilers.]

Mr. COLEMAN SELLERS (of Philadelphia) complimented the Chairman of the Committee that made the report (Mr. Horace A. Towne, of the Northern Pacific), who prepared it, and said that, though his name was signed to it, he never saw it until it was read. He corrected some statements in it which were credited to him. He had not meant to say that water distilled from sea water had a bad effect on boilers, and such is not the fact. Water used with surface condensers on ocean steamers injures boilers unless salt water is admitted so as to produce a slight scale. They provide fresh water on starting, and use it over and over, and this injures the boilers. Some think it is because the tallow or something else enters the cylinders and produces a destructive acid. Distilled fresh water has been entirely abandoned for ocean steamers with surface condensers, and every day a certain quantity of salt water is injected into the boilers, so that a scale of a definite thickness may be produced, which is found to prevent injury to the boiler. He knew nothing personally of the chemicals recommended by Professor Sewall in the report. He thought that a mechanical as well as a chemical action in the matter was needed. Dr. E. De Hain, a Prussian manufacturer of chemicals, says that agitation of the chemically treated water is needed to produce the best results. To effect this, a Mr. Koetting has invented a steam blast to throw air into the water, by which the water is very thoroughly mixed. In this way, in Germany, carbonate of lime is deposited by the use of caustic lime; sulphate of lime by chloride of barium.

Some waters containing carbonate of lime or sulphate of lime, and other substances, do not seem to injure the boiler, or to form any scale. Some water used on the Lake Shore & Michigan Southern road, which looks much like whitewash, contains 26.6 grains of solid matter per gallon, as follows:

Sulphate of lime.....	3.5
Bi-carbonate of lime.....	14.5
Bi-carbonate of magnesia.....	2.0
Bi-carbonate of iron.....	1.5
Chloride of sodium and potassium.....	3.8
Soluble silica.....	1.0
Organic matter and loss.....	0.3

It has also 19 $\frac{1}{2}$  cubic inches of pure carbonic acid per gallon. Yet this matter does not injure the boilers in the slightest degree, or form any scale. The impurities are deposited in the form of powder and are easily blown out. He thought it would be well to test the method recommended by Professor Sewall

and that tried in Europe. He believed that chloride of barium was very cheap. It would be necessary, however, to know the constitution of the water.

Mr. W. A. ROBINSON (Great Western of Canada) wished to hear what effects on incrustation had been observed as resulting from decreasing the number and size of the boiler tubes. Those using old locomotive boilers for stationary boilers had been disappointed in the results, forgetting that a much smaller tube was needed in the locomotive. Locomotive boilers with 150 tubes have but an inch of space between the tube and the boiler shell. He had got much better results by removing ten of the tubes. The committee had recommended  $\frac{2}{3}$  in. as the diameter of locomotive boiler tubes, which would make an important change.

Mr. PHILLBRICK (Maine Central) had had an engine which easily got out of water; he took out 14 of its 130 tubes and never had any difficulty afterwards.

Mr. SERRAQUE (of Pittsburgh) wished to know if any one had had trouble in using tubes 2 in. in diameter and 13 feet or more long.

Mr. HAYES (Illinois Central) wished to ask Professor Sewall if his process had been tested in any locomotive. He had a bottle of water prepared by the ingredients sent by the Professor, and judging from that he should think it would make the water foam. On shaking, the upper part becomes saponified, or full of foam.

Professor SEWALL said that the preparation was tried in a tank of 60,000 gallons. At first it produced a slight foaming, which disappeared after a few minutes, and the result was entirely satisfactory. Doubtless if put into a boiler in great excess it would produce foam, but when decomposed in water, and after recombination is allowed, there will be no foam. This process takes place quickly; the precipitation in an hour or two, and much sooner if there is a large proportion of sulphate of lime in the water. The separation takes place instantly; the precipitation more slowly. In proper proportions he was satisfied it would not cause foaming.

Mr. HAYES (Illinois Central) said that with the specimen which Prof. Sewall furnished him it took about 24 hours to settle, and during the first 12 hours he could not detect any precipitation; after that it gradually went down until there was about half an inch of deposit in a half gallon of Lake Michigan water, which becomes very turbid after a long wind.

Prof. SEWALL asked if the water was turbid or clear. If turbid, was not the sediment material suspended mechanically? He believed there was very little lime in Lake water.

Mr. HAYES said it was turbid. It is pumped directly from the lake, and there is a large deposit in the tank. They would have to use three or four times as many tanks with Prof. Sewall's process, in order to give it time to settle.

Mr. COLEMAN SELLERS said the paper describing the process used in Germany would be given to the Publication Committee, who could print what they pleased of it. As to the statement mentioned in the report of non-deposit when there was very rapid motion in the tubes, his experience did not agree with it. In their establishment they had a locomotive boiler in which the water was inside of the tubes instead of around them, and there was a very rapid current in them, but a deposit occurs very rapidly.

LOCOMOTIVE TESTS.

Mr. FORNEY, for this Committee, reported verbally that the information asked in the Committee's circulars had not been supplied, and they felt unable to make a report. The Committee reported progress and asked to be continued. They urged members to present accounts of experiments made in previous years, which many of them had made. The Committee was continued.

LOCOMOTIVE CONSTRUCTION.

The report of the Committee on this subject was then read. The discussion was postponed until Mr. Brooks, who had some drawings to exhibit, should be present.

WEDNESDAY AFTERNOON'S SESSION.

After recess the report of the Committee on Locomotive and Tender Wheels (reported in the Railroad Gazette of May 15) was read and accepted, and, on motion of Mr. LAUDER the Secretary was directed to incorporate with it the table of mileage of passenger car wheels on the Lake Shore & Michigan Southern road, which was appended.

DISCUSSION ON LOCOMOTIVE AND TENDER WHEELS.

Mr. WOODCOCK (Central of New Jersey) said he had a set of steel tires turned some months ago, and they were then 1 5-16 inches thick. They were sound and tight, and he left them on as an experiment. They were turned again three months since and reduced to 1 1-16 inches, and put on an engine that is still running. On taking them off they found a flaw on the inside from a hole through which a screw had been inserted; there were two cracks from that hole out. They thought that was as thin as they ought to run. He had not the exact mileage, but it was about 270,000 miles. They had one steel tire break into five pieces last winter; it was  $\frac{2}{3}$  inches thick, with no apparent fault. The engine weighed 38 tons; he did not know the mileage or the thickness when new, as he was not on the road then, but their standard thickness for that class of engines was  $\frac{2}{3}$  inches.

Mr. CARSCADIN (Chicago, Rock Island & Pacific) said he had had two steel tires break, one  $\frac{2}{3}$  and the other two inches thick. One broke into four pieces, the other into two, and no flaw could be found in either. They were both under 38-ton freight engines.

Mr. LAUDER said that the Committee had stated that 1 $\frac{1}{2}$  inches was the least thickness of tire that could safely be run. He had himself run them thinner than that, and thought others had too; he would like to hear from them.

Mr. CARSCADIN said that when he could not turn a tire and leave it 1 3-16 inches thick, he ordered a new one. He thought 1 $\frac{1}{2}$  inches the limit of safety. He had run them less than that, but it was on a light 22-ton engine.

Mr. WOODCOCK thought it would not be advisable to run a tire lower than 1 $\frac{1}{2}$  inches. In the case he mentioned it was done as an experiment, to see what it would stand.

Mr. PEDDLE (Terre Haute & Indianapolis) thought that when tires were run so thin they were apt to get loose.

Mr. WOODCOCK said that two out of those six tires had become loose, but rivets were put in them.

Mr. SETCHEL (Little Miami) said it would depend upon the time of year when the tires were turned. In hard freezing weather with a rough track  $\frac{1}{2}$  inches was no more than one inch in summer. In warm weather one inch with a flange of 1 $\frac{1}{2}$  inches is enough with a freight or slow train.

Mr. HILL (Erie) said that in 1869 Engine No. 2 was transferred from the Northern New Jersey to the Erie road. They had no record as to the original thickness of the tires or when they were put on, but they ran on that engine till eight months ago, when they were turned down to 1 $\frac{1}{2}$  inches, put on again, and they are still running and perfect. The engine runs about 125 miles a day. Mr. Krupp heard of those tires and asked that they be shipped to him when finally taken off the engine. In answer to questions, Mr. Hill said the engine weighed 26 tons, and was built by Danforth, Cook & Co.; also, that this was an exceptional case, and he would not recommend running the tires less than that.

Mr. CARSCADIN said that with a heavy engine and a rough road when a tire gets down to 1 $\frac{1}{2}$  inches it is very apt to draw a peg loose.

Mr. HILL said they had several sets of tires running that were less than 1 $\frac{1}{2}$  inches.

Mr. WILDER (Erie) had one tire break last winter that was



2 1/2 inches thick and had no apparent flaw. They had had other tires running only 1-16 inches thick.

Mr. CARSCADIN asked what shrinkage there was on the broken tire.

Mr. WILDER could not say. It had run two years. It was built at the Brooks Works and they generally use there 1-16 inch shrinkage to a 5-foot wheel.

Mr. WELLS had found that his tires became loose when worn down to 1 1/4 inches and sometimes when to 1 1/2 inches. After they were lined up and turned up they ran until they were one inch on the tread. One set was only 3/4 inch, but had not rotten loose. He thought 1 1/4 inches was thin enough, or 1 1/2 inches on heavy engines.

Mr. WOODCOCK would like to know the average wear of steel tires on truck wheels.

The PRESIDENT said there was a table in the report giving that.

Mr. WOODCOCK said on their road they had not come up to expectation. The inventor said they ought to run 200,000 miles.

Mr. ROBINSON (Great Western) would like to know something of the action of the tires after breaking.

Mr. LADUE said there was no information given to the Committee. Most of the broken and removed tires were on the Lake Shore road and were given in a tabular form.

Mr. GRAHAM (Lackawanna & Bloomsburg) said that in the cases he reported the tires remained on the wheels, and no damage was done.

Mr. ROBINSON said that in Europe it is the exception to have steel tires without having them secured to the wheel by a flange or by set screws, or some other means. Here the opposite practice was in vogue of using shrinkage only. An English railway would be afraid to run engines that way.

Mr. WILDER said that one tire they broke last winter was held by shrinkage only, and the engine ran from Suspension Bridge to Buffalo with the broken tire in place. Another one, which was 1 1/2 inches thick, was held by set screws. The tire slipped around on the end of the set-screws, and the weight of the engine drove them back and broke out the holes. It broke the center casting so that it spoiled the wheel. They had another engine damaged by set-screws. He thought they did no good, and there was danger of spoiling the wheel.

Mr. CARSCADIN said that the tire he had spoken of broke right through the countersink for the end of the set-screw, and all the breaks were right across the hole. The hole in the center, where the drill ran in, was 5-16 inch deep, at the outer edge about 1/4 inch.

On motion, the discussion was then closed.

#### DISCUSSION ON CONTINUOUS TRAIN BRAKES.

The report of the Committee on Continuous Train Brakes was then read and accepted. An abstract of it appeared in the *Railroad Gazette* of May 15.

Mr. WOODCOCK (Central of New Jersey) said that his road had used the vacuum brake since July, 1872, and it had given entire satisfaction. They liked it for its simplicity, effectiveness, and the small cost of repairs. The latter expense with them was \$1.22 per car per year, and \$9.55 per engine.

Mr. HUDSON (Rogers Locomotive Works) said he had learned that the Vacuum Brake Company had sold out to the Westinghouse Company. In conversation with Mr. Westinghouse recently, he had stated that they had found it better to use wrought iron shoes on tired wheels and cast iron on cast wheels; that the wheels were not so liable to break. In other words, that the cast iron shoe did not heat the wheel as much as a wooden shoe. He would like to hear some experience on this point.

Mr. CHAPMAN (Cleveland & Pittsburgh) said they had used for a year past on their passenger cars malleable iron brake shoes, much lighter than common cast iron. They wore longer and did better.

Mr. WELLS asked the relative cost.

Mr. CHAPMAN said the malleable iron shoes weighed a little less than half the others, cost about three times as much, and wore four times as long.

Mr. CARSCADIN said they had been using the Westinghouse, but found it rather expensive to keep up.

Mr. HOLLISTER (Philadelphia & Reading) said that he had had the vacuum brake on 6 engines and 20 cars for a year. There was no expense except occasionally to replace a hose that had been broken off.

Mr. GRAHAM (Lackawanna & Bloomsburg) said that they had put the vacuum brake last fall on six engines and 100 cars, and had had no expense except to replace a hose that was pulled apart by reason of the neglect of the brakeman to uncouple it when a car was detached.

Mr. PEDDLE (Terre Haute & Indianapolis) said that the reports sent to the Committee had been very meagre. They would have been glad of the information now presented.

The PRESIDENT did not blame the Committee for this reproach, but hoped it would not deter members from speaking.

Mr. SETCHEL (Little Miami) thought that this subject was only second in importance to boilers. On his road they thought they could not do without a continuous brake. They had the Westinghouse on 23 engines and 60 cars, and he had been surprised to see how light the expense was. He had kept an accurate account and had given the result to the Committee. He thought, however, that the air pump might be made more simple and cheaper. He could not see why the Westinghouse people stuck to this pump, unless it was to justify the high price they asked for the brake. He thought it would be better to have a pump worked by the engine when in motion. The objection was made that this would make it necessary to have air always stored up in the reservoir, but that could easily be managed by a stop-cock. With a tight reservoir pressure could be kept up all the time. By this arrangement the expense for the pumps would be only one-tenth of what it is now. The Loughridge air brake on the Baltimore & Ohio cost nothing except for oil. He thought they should favor something cheaper than the Westinghouse.

Mr. LANNAN (Western Maryland) said they had used the Loughridge brake since February last on three engines and two trains. They had no difficulty in holding 75 or 80 pounds pressure in the reservoir, even over night. They put the stop-cock as close to the reservoir as possible, and in the morning when they ran out and opened the cock they found that they had not lost usually over three pounds pressure. The pump and reservoir cost about \$90. The reservoir held about 13 cubic feet. This brake gave them less trouble than the hand brake. Mr. Loughridge told him he had written a letter to the Committee with a challenge to lay it before the Convention.

Mr. PEDDLE said the letter reached him too late to put in the report. Mr. Loughridge challenged all parties to meet him at the Centennial in Philadelphia next year and run against his brake, each party to equip ten cars and take a week for the trial if necessary.

Mr. LANNAN said it needed no other springs to throw off the brakes than those already in use for the hand brakes. They had no trouble in starting a train on their heaviest grades, and they had one of 95 feet to the mile.

Mr. ROBINSON asked whether any members were using air brakes on freight trains, and if so, whether they had much trouble with the air pipes. On the Great Western they were much pleased with the Westinghouse brake. But they hauled many foreign cars and they frequently had to connect under these with temporary rubber pipes and take them off again at the end of the run of 230 miles. These pipes were expensive, because they frequently broke, but that was not fairly to be charged to the air brake.

Mr. YOUNG (Cleveland, Columbus, Cincinnati & Indianapolis) asked whether any member was using the Westinghouse brake on driving wheels.

Mr. ROBINSON said they had one on a passenger and one on a freight engine. He had not been able to pay much attention to them, but thought that they were equal to two or three car brakes put together. When put on suddenly it seemed almost to lift the engine off the track.

Mr. STRATTON (Pennsylvania) said that they were fitting up a number of engines with brakes on the drivers, but they had run so little that no results had yet been obtained. He had expected that the brakes would be held rigidly up to the drivers, but in riding on the engines he found that the elasticity of the air in the cylinders seemed sufficient to make the connections easy. Thus far it does not seem to have had the expected effect of straining the axles in opposite directions. He thought that the use of the driver brake would save the car wheels, the car brakes not having to hold the engine.

Mr. ROBINSON said he had been afraid of the side-draw of the driver-brake, but found, as Mr. Stratton said, that the action was entirely counterbalanced. It was simply the wheel brake acting against an air brake. They ran very fast and came to a full stop, but had no jerking motion. He had been told that the Westinghouse Company was getting up a new air-pump, simpler and cheaper than the present one.

Mr. WILDER (Eric) asked what effect the brake had on the engine tires.

Mr. ROBINSON said he preferred to have the tire fastened, but did not think the brake would have any bad effect if the tire was loose.

Mr. STRATTON thought the driver-brakes had not been used long enough to get satisfactory results yet. He had occasion to notice this month, in making up his report, that on his division there had been only one engine running without air, and that was that on one engine a set screw on the tie-plate of the pump got loose, and they had to run six miles into Pittsburgh without air. He thought they had a perfect working-pump.

Mr. WOODCOCK said they had several engines running with driver-brakes, and they found it did not wear all four tires alike. For that reason it had been a question whether to continue its use, though it worked very effectively. They found that one wheel was worn much more than other, and they had to turn the tires.

Mr. YOUNG said he had put a brake on the drivers of one engine. It seemed to wear both tires and shoes very fast. A set of cast-iron brake shoes would not run more than 250 miles with the usual stops. The brake had the Westinghouse cam motion. There seemed to be too much power and there was an unpleasant jump when the brake was put on.

Mr. HUDSON said that where the brakes were used continuously, as on a heavy grade, the tires must be fastened, or they would be heated and get loose. In building some engines for South America recently they had to do this.

Mr. ROBINSON said the man who drove the engine with the driver brake asked to have a stop-cock put in, so that he could use it separately from the train brake. His idea was that it was too powerful to use all at once, and he wanted to put on the train brake by itself first and the driver brake only in cases of emergency, to stop the train after the first shock had been taken off.

On motion the discussion was closed.

The PRESIDENT said that the report of the Committee on Lubricants was not quite ready. A committee was appointed last year to attend the Government experiments on boiler explosions, but there were none made, so that there is no report. He suggested that the Committee be continued.

The report of the Committee on Narrow and Broad Gauge Rolling Stock was then read. There was no discussion.

The report of the Committee on Machinery for supplying water to tanks was then read and discussed. The report was postponed.

The report of the Committee on Mechanical Laboratory was called for, but, pending its reading, the Convention adjourned till Thursday morning at 9 o'clock.

#### THURSDAY'S SESSION.

The Convention assembled at 9 a. m.

#### REPORT ON LUBRICANTS FOR LOCOMOTIVES.

This report, of which the following is an abstract, was then read and accepted:

This Committee, consisting of F. B. Miles (of Ferris & Miles, Philadelphia), H. D. Garrett (Pennsylvania Railroad), and Edwin Garfield (Hartford, Providence & Fishkill Railroad), report that the economical result of any lubricant in practice depends on many things besides its own intrinsic merit, such as weight of engines, character of water, fuel, ballast, dust, state of track, grades, condition of machinery, and, above all, the care exercised by those in charge of lubrication. Questions asking for the results of experience under these varying conditions were sent to members of the Association, 20 of whom returned replies.

From these replies a table was compiled, and the following deductions drawn: Of the 20 members replying to the circular, 15 use tallow exclusively for valves and cylinders, and several, having pure tallow, report an exceedingly high duty; the Illinois Central 105 miles per quart, the Vandalia Line 109 miles, and the Texas & Pacific 117 miles. Manufactured tallow is apt to be bleached with chemicals and adulterated, or fermented so as to contain stearic acid, which corrodes the iron and gums up the working parts. Mr. King, of the Charlotte, Columbia & Augusta, suggested that this acid may have more effect on some irons than on others, as one of his locomotives, under precisely similar circumstances, is never injured by tallow which corrodes and gums the others. Mr. Robinson, of the Great Western of Canada, gets a higher duty from lard oil and cylinder oil, but finds tallow cheaper. The general verdict is in favor of pure tallow, and of lard oil when pure tallow cannot be had.

Twelve of those answering the Committee's circular feed by cab tube in preference to automatic cups; five prefer the Dreyfus cup, which acts by displacement. The highest duties are given by the cab tubes, and they occur on level roads where no long distances are run without steam. Mr. Wells, of the Jeffersonville, Madison & Indianapolis, reports that the automatic cups use more lubricant, but that they enable the valves to be run longer without refueling, and says that too great economy in lubrication is not best for the machinery. The cups acting by displacement do not work well when long distances are run without steam, as they are worked by the condensation of steam. General preference is given to cab tubes. The lowest duty reported for cylinder and valves is 56 miles per quart—on the Delaware, Lackawanna & Western.

For guides and journals petroleum seems to be generally adopted, either alone or mixed with lard, fish or tallow oil. It is generally admitted that good sperm or lard oil would be a more perfect lubricant, but the cheapness of petroleum and the ease with which other oils can be tempered with it causes it to be used. The West Virginia "natural oil" is most frequently named as excellent for lubrication. Self-feeding cups are the rule and give the highest duty. Many prefer decidedly the Dreyfus rotary spindle cup.

The Central of New Jersey, of standard gauge, used a manufactured oil, doubtless some mixture of petroleum, and the Delaware, Lackawanna & Western, of 6-foot gauge, tallow for cylinders and valves and petroleum alone for guides and journals; the results were the same for both—27 miles per quart for total lubrication. The roads are similar except in gauge.

The table shows for total lubrication that the lowest mileage per quart of lubricator was on roads with long grades on

which engines run considerable distances without steam, and where there is much dust, or fine sand, or grit from fuel or ballast. Dust seems to have more effect than grades, the lowest duty, 22 miles per quart, being on the Philadelphia, Wilmington & Baltimore; the next, 27 miles, on the Central of New Jersey and Delaware, Lackawanna & Western. The highest duties are on level lines. After the table was made up, Mr. Wells, of the Jeffersonville, Madison & Indianapolis, reported the greatest mileage per quart, which was for March, 1875, the average of five passenger engines being 124 miles per quart of tallow for cylinders and valves, and 76 miles per quart of West Virginia natural oil for guides and journals—an average of 50 miles per quart for total lubrication of passenger engines. For the same time freight engines used a quart of tallow per 87 miles on cylinders and valves, and a quart of West Virginia oil per 62 miles on guides and journals—37 1/2 miles per quart for total lubrication.

*New Systems and New Lubricants.*—Mr. Rushton, of the Atlanta & West Point, has tried the Brosius system on car trucks—a wooden saddle covered with cotton web held up by springs against the under side of the journal in the oil cellar of the journal-box. He reports the result as 1,125 miles run per quart of West Virginia oil mixed with lard oil and tallow. Mr. Graham, of the Lackawanna & Bloomsburg, had tried a tank-box packed with plumbago and oil. At the time of his report it had made 8,000 miles in three months without repacking. Mr. Haughlin, of the Texas & Pacific, had tried a compound called "polar grease," and in car-journal boxes 2,600 miles had been run per quart.

#### DISCUSSION ON LUBRICANTS.

Mr. F. B. Miles (Ferris & Miles, Philadelphia) said that the Committee had been promised, but had not yet received, information from the Lehigh Valley road with regard to a system used on it for two or three years, and consisting of a rotary disc fastened to the end of the axle, which throws oil on top of the journal as it rotates. They claim wonderful results for it.

Mr. HAYES (Illinois Central) suggested that the Committee be continued and an improvement in definiteness in the circulars of inquiry. Some report oil used in head-lights and other lamps as well as for lubrication, which makes a wide difference in comparisons. His road included oil used on the engine for all purposes. Their engine men carry a torch with an immense blaze at night, for examining the engine, and the oil for that is included, as is that for the cab lamps and head-light, and, on switching engines, the lights at both ends, and the fireman's lamp. The circular should require a separate statement of the oil used for lubrication.

#### DISCUSSION ON STANDARD AXLES.

The report on "Standard Axles" published in full in the *Railroad Gazette* of May 15, was then read.

Mr. FORNEY (*Railroad Gazette*) after reading the report offered the following resolution:

"Resolved, That this Association concur with the Master Car-Builders' Association in recommending the adoption of the standard for car and tender axles which that Association has proposed, when said axles are to be made of iron."

Before the question was put, he stated that he would report some experiments made the previous week at Springfield, Mass., intended to throw some light on the subject, but which were not very successful. Messrs. Adams and Chamberlain, of the Boston & Albany, fitted up a number of cars with large and a number with small axles. Those with small axles were old cars, but with new axles and bearings; the wheels were old. Those with new axles were new throughout. One with large axles was put empty on an incline and permitted to run by gravity as far as it would. It ran from its starting point to the middle of the bridge over the Connecticut, the grade being 70 feet per mile. Then a car with small axles was started from the same point: it would have run into the other car if the brakes had not been applied. Then a car with small journals loaded with 20 tons was started: it ran across the bridge, and upon a curve on the other side, a distance of 7,897 feet. The car with the large journals with the same load stopped 540 feet short of the other, making a difference of about 7 per cent. in favor of the loaded car with small journals. The experiment was repeated with the empty car with small journals, and it ran further than the loaded one, about 1,155 feet, or 15 per cent. further. They intended to repeat the experiments elsewhere. He thought the experiments unsatisfactory because the cars were all new, having run only from Boston to Springfield. If they had been in service some time, he believed the large journals would have been better lubricated. The new wheels probably did not run as easily as old ones. Then in the cars with large journals the axles in the trucks were spread 17 inches wider than the others, which caused more resistance to them on the curve beyond the bridge. Even with this difference was but 7 per cent., and less for the loaded than the empty cars. The experiment did not lessen his faith in big axles.

The PRESIDENT thought the question should be fully discussed before adopting the resolution.

On motion of Mr. Forney, owing to the absence of a considerable number of members, further discussion was postponed until 12 o'clock.

#### MECHANICAL LABORATORY.

The report of the Committee on Mechanical Laboratory, an abstract of which was published in the *Railroad Gazette* of May 15, was then read and accepted. It was not discussed.

#### RECESS FOR PAYING ASSESSMENTS.

On motion of Mr. Lander, a recess of five minutes was taken, to enable the Committee on Assessments to collect dues from members, many of whom had come in since the appointment of the Committee, and might not know of it. Before putting the question, the President stated that those entitled to membership by the constitution, could become members by applying to the Secretary during the recess.

#### GOVERNOR BIGLER ON THE CENTENNIAL.

On re-assembly, EX-GOVERNOR BIGLER, of Pennsylvania, on motion of Mr. Brooks, was invited to address the Association. EX-GOVERNOR BIGLER said that, though not a mechanic in the usual sense of the term, he was a printer, and had a great interest in every organization of the kind. He knew no more commendable work in which the members could be engaged; their organization could not fail to produce results of the highest value.

He was entrusted by Congress with the duty of going about the country to labor in behalf of the celebration of the Centennial Anniversary of Independence, by the international exhibition to be held in Philadelphia next year. He desired to elicit their interest in its behalf. Only money was needed to make the preparations equal to any the world has yet seen. As Government does not furnish the money, they had to canvass the country for it. The railroads should be very helpful, because they will be much benefited by the increase in travel. The master mechanics could create the impression that therefore they ought to be generous in helping the exhibition. Congress prescribed that capital should be raised by a corporation with the right to sell \$10,000,000 stock, which it is now trying to do. About \$5,000,000 is raised, and \$3,000,000 of it is a gift not represented by stock. They want a million and a half or two millions more. Philadelphia and Pennsylvania have given two and a half millions for the buildings. This leaves a better chance for the stockholders. The object of itself should inspire the American heart, and ought to induce us to make the exhibition a success.



without stopping to inquire if we would get any of our money back. The enterprise would have a harmonizing influence and an educating influence. He hoped they would extend their help. He was at the head of the New York Branch of the Centennial Board, with office at the St. Nicholas Hotel, where they could get certificates of stock, also lithographs of the buildings and descriptive pamphlets.

#### SUBJECTS FOR NEXT MEETING.

The report of the Committee on Subjects for the Next Year was then read and adopted.

#### BOSTON FUND.

Mr. Brooks offered the following resolution:

"Resolved, That the Boston Fund, amounting now, with accrued interest, to \$3,620, be invested in Government securities, to be selected by the duly appointed Trustees, and not to be distributed for the purpose of expenditure unless authorized by the majority of the members present in open Convention, and then only after due notice of motion to expend the same has been given at the session immediately preceding. The interest however derived from such securities may be expended by the Trustees when necessary to meet any current expenses of the Association, provided a full account of the same be duly reported along with other financial statements."

The President stated for the information of members that in 1872 a fund of \$3,000 was presented to the Association by citizens of Boston; that it had been kept at interest and then amounted to \$3,620. The resolution was to prevent disturbing this fund.

Mr. Forney suggested and Mr. Brooks accepted an amendment in a form providing that the vote to use the money should not be taken until the subject has been brought up at a previous meeting.

Mr. FLYNN (Western & Atlantic) wished to amend so that the interest should be invested yearly as a sinking fund. He thought the members would bear assessments heavy enough to pay all expenses. So held, the fund would soon become large enough to do great good, give the Association strength and character. Mr. Brooks personally approved of Mr. Flynn's amendment, but said there were several members who thought the principal as well as interest should be used to pay expenses, and his resolution was intended to harmonize the two elements.

Mr. FLYNN again urged the adoption of his amendment for accumulating a fund.

Mr. ROBINSON (Great Western of Canada) said the present trustees had so reinvested the interest, and that they would continue so to do if kept in office. The resolution was intended to make provision for cases of necessity, and there was no intention of using the interest for expenses.

Mr. FLYNN's amendment was agreed to, and the resolution as amended adopted.

#### NEXT PLACE OF MEETING.

The Committee on this matter nominated five places—St. Louis, Philadelphia, Augusta, Ga., Providence and Cincinnati.

There was a considerable discussion on the selection, in which Mr. Brooks urged a Western city for the meeting two years later, which would enable members to attend the great Musical Festival in Cincinnati at the same time, and Mr. Coleman Sellers urged Philadelphia for 1876, because of the Centennial, which is to open May 10, and which all the members will wish to attend. He suggested that if Philadelphia should then be so crowded that accommodations could not be had, some place easily accessible from Philadelphia might be substituted, though he thought the Philadelphia should be able to accommodate members at their houses if the hotels should be full. Mr. Brooks was afraid Philadelphia would be too crowded. Mr. Setchel moved in favor of Providence. Mr. Fry moved that Philadelphia be selected by acclamation. A member opposed this motion but thought they might meet at Atlantic City, Pittsburgh or Reading, and still visit Philadelphia. Mr. Sprague thought the next Convention should be in the West in justice to the western members. Mr. Flynn would have urged meeting in the South but for the Centennial, and thought they would best meet in some place near Philadelphia. Mr. Sprague thought Philadelphia would not be crowded so early as May.

Philadelphia was then agreed upon as the place of holding the next annual Convention.

#### POSSIBLE POSTPONEMENT OF CONVENTION.

It being thought possible that the Centennial (which was first to be opened April 19, and has since been postponed to May 10) may again be postponed, Mr. Coleman Sellers offered a resolution that, in case of postponement of the Centennial, the officers of the Association shall notify the members of a postponement of the Convention to some date not more than one month from the second Tuesday in May. This resolution was adopted.

#### REPORT ON AXLE TESTS.

Mr. COLEMAN SELLERS then read the report of the Committee on the axle tests made at the Stevens' Institute the previous day, as follows:

#### REPORT OF THE COMMITTEE ON TESTS OF AXLES.

This committee reported that they had visited the shipyard of Mr. John Roach, in New York, to see some tests of steel axles made at the Midvale Steel Works, Philadelphia, and some iron axles furnished by members of the Association. The iron axles were from two roads. Those marked (to distinguish them) brand No. 1, were forged in the shops of the road, and were said to have been made with great care and from good material. The others, marked No. 2, were furnished by a master mechanic, who stated that they were furnished by a maker who had been supplying the road for 15 years, and in all that time had had but one axle broken. The test was made with a drop weighing 1,700 pounds, which could be raised to a maximum height of 34 feet. The axles to be tested were laid upon cast-iron standards, rounded at the top, measuring 3 feet 9½ inch from center to center of standard, these standards being attached to a heavy bed-plate. All axles tested were marked in the center with chalk, and at a distance 24 inches each side of the center as the points from which the measure of deflection should be determined.

The first test was of a Midvale steel round bar, 5 feet 3 inches long, 4-16 inches diameter.

First blow, 25 feet fall, bent the bar 6½ inches. Second blow, 25 feet fall on the reversed bend, came within 3-16 of an inch of straight, that is did not quite straighten the bar.

Third blow, 25 feet fall, not reversing the bend, deflected the bar 5½ inches. Fourth blow, 25 feet fall, not reversing the bar, increased the deflection 1½ inches, bar.

Fifth blow, 25 feet fall, not reversing the bar, increased the deflection 4-15-16 inches.

Two more blows of 34 feet fall bent the bar 3¼ and 4¼ inches more, and it was laid aside not seemingly injured.

The second test was with a round iron bar, 4-3-16 inches diameter, brand No. 1.

First blow, 25 feet fall, produced 7 inches deflection.

Second blow, 25 feet fall, ¼ inch deflection, reversed.

Third blow, 25 feet fall, 7 inches deflection.

Fourth blow, 25 feet fall, ¼ inch deflection, reversed—crack in under side.

Fifth blow, 25 feet fall, parted the bar.

The third test was with an iron axle, brand No. 2, 5-13-16 inches diameter at center, 4¼ inches at ends.

First blow, 25 feet fall, 9¼ inches deflection, with a bad crack.

Second blow, 25 feet fall, parted the axle.

The fourth test was an axle of brand No. 2, made in May, 1873, 4¼ inches diameter at ends, 4 inches at center.

First blow, 25 feet fall, bent it 8¼ inches and cracked it badly. No other blow was given this axle, as it was too far gone.

The fifth test was of a steel axle made at the Midvale Works, 4 inches diameter at center and 4-15-16 inches at ends.

First blow, 25 feet fall, deflected it 6½ inches.

Second blow, 25 feet fall, reversed, exactly straightened the axle.

Third blow, 25 feet fall, deflected it 6½ inches.

At this stage it was decided to use 34 feet blows to hurry a fracture in order to see how the steel would look.

Fourth blow, 34 feet fall, deflected it 2½ inches more.

Fifth blow, 34 feet fall, deflected it 6½ inches more.

Sixth blow, 34 feet fall, deflected it 9¼ inches more.

Seventh blow, 34 feet fall, axle reversed, brought the deflection back to 9¼ inches.

Eighth blow, 34 feet fall, reversed, reduced the deflection 1½ inches.

Ninth blow, 34 feet fall, not reversed, deflected it 5½ inches more.

Tenth blow, 34 feet fall, not reversed, deflected it to 12½ inches.

Eleventh blow, 34 feet fall, reversed, broke the axle.

The iron axles were of good sound iron in the fracture. The steel one broken had all the appearance of a good quality of steel.

The last test was made with an axle of brand No. 1 to test the 34 feet fall. The axle was about 4 inches in the center and was cracked at the first blow.

#### RENEWAL OF DISCUSSION ON STANDARD AXLES.

The discussion on the resolution in favor of a standard axle was then taken up again, in accordance with the resolution postponing it.

Mr. FORNEY, at the request of Mr. Carscadin, stated that the size of the journal proposed for adoption was 3¼ in. by 7; the total length of axle over all, 6 ft. 11½ in.; wheel-seat, 4¼ in. by 8; diameter in center, 4 in.; collar, 4¼ in. in diameter by ¼ in. thick.

Mr. COLEMAN SELLERS said that, though he agreed to the submission of the resolution, he did not think the matter would be ended if it was voted down. There were many things to be considered in determining the dimensions of a standard axle. He approved the size of journal recommended, but was not sure that he would recommend the proposed standard axle in all respects. It was well to proceed slowly in making such radical changes. There may be further light as to the proper form of axle and the proper distance of the journals from the wheels. He preferred that the resolution should be only with regard to the size of journal. There was a fair chance that cheaper steel would be produced, and if it came into use for axles, possibly the size of journal used with iron axles might be preserved and greater strength secured. It seemed to him that it would be wise to keep the question open a little longer.

Mr. FORNEY drew upon the black-board a sketch of the proposed standard axle.

Mr. PEDDLE thought that the weight stated in the report, 235 lbs., could not be correct.

Mr. FORNEY said that the weight was given him by Mr. Hoit, of the N. York Central. They had modified the form of the axle between the wheels very much by making it a little smaller, and had reduced the weight slightly from the figures given by the other Association.

Mr. HAYES (Illinois Central) was pretty well satisfied that Mr. Forney must be mistaken as to the weight. On their road the axle used had a journal 3¼ by 6 in., 4¼ in. diameter of wheel-seat, and 4 in. diameter in center. Its average weight is 343 lbs. in the rough. He thought a vote in favor of adopting this axle would almost seem to make its adoption obligatory on the roads which they represent. He should not be willing to do that, because they now had axles known to be safe and good under their 5,000 cars and their tenders. He might agree with the Committee upon a standard axle, but would not vote that his road should throw away all the axles they now have and adopt that standard. It would be expensive, and the companies would not be willing to incur the expense. Their axle seldom if ever breaks. To his recollection but two or three of his road's axles had broken in 18 or 19 years, and those were under passenger cars. Their usual service was 2½ years under passenger cars, when they were turned over to freight cars. The term of service under tenders was the same. He wished to understand that a vote in favor of the standard axle recommended by the Committee did not bind them to adopt it.

Mr. SEDOLEY (Lake Shore & Michigan Southern) could not vote for the resolution. Where the standard axle had been used under heavy cars on his road it had not given as good satisfaction as a smaller journal. It increased the weight, made it necessary to change the pattern for wheels, or put more iron around the hubs. He thought it not as good as the one he was using, which he considered the best that could be adopted. According to his recollection, in their equipment of 10,000 cars, many long in use, the depreciation does not exceed 3 per cent., under a heavy service. If that is the case, he did not see why they should increase the size of their axle 25 per cent., and the wheel perhaps in proportion. He wished to hear the experience of those who had used the standard axle and their reasons for adopting it. Because the Master Car-Builders had made a mistake in proposing it should be no reason for this society's adopting it.

Mr. FLYNN (Western & Atlantic) thought that two sizes of axle should have been reported by the Committee. The standard gauge in the South is five feet. He did not look upon the proposed standard with favor. The axle on his road had these dimensions: Journal, 6x3¼ in.; wheel seat, 4¼ in. diameter; axle, 4¼ in. diameter. This axle had answered remarkably well. He had adopted it shortly after the war. Previously the diameter of journal was the same as the diameter of the present axle. His road was a succession of curves from one end to the other. These test axles severely. Perhaps it might be well, in adopting the report, to recommend the master mechanics to use the form proposed when they can. He could not see any advantage in 7 in. length of journal over 6 in.

The President said that the Committee's resolution only recommended the adoption of the standard.

Mr. WILDER (Erie Railway) wished to know why that particular size of wheel-seat was adopted, and whether it was to keep up the proportion between wheel-seat and journal existing in the old journal, or to get a stronger axle. If the object was to increase the size of journal to assist lubrication, why could it not be done with the old size of axle? This new wheel-seat is 4¼ in., the old one was 4¼. He saw no reason for this increase.

Mr. WELLS (Jeffersonville, Madison & Indianapolis) thought they should not recommend the standard proposed by the Committee and recommended by the Master Car-Builders' Association, unless they believe it to be the best. If they can carry loads safely with a wheel-seat 4¼ in. in diameter, there is no need to increase it. The Committee had presented no evidence conclusive to his mind that the size they propose is any better than other sizes in use. The master mechanics have not the power to change axles. His company had adopted a standard size, and connecting roads had adopted the same size. It would be almost out of the question for it to adopt a different standard. He was opposed to committing the members of the Association in favor of adopting the proposed standard, under the circumstances.

Mr. ROBINSON (Great Western) asked Mr. Forney whether the dimensions proposed were the result of any tests, or were based

on any theory. He noticed that there were odd quarter inches in the dimensions, as 6 ft. 11½ in. in length.

Mr. FORNEY said that, so far as he knew, there were no theoretical considerations which caused the adoption of the standard. It was more of a compromise between conflicting ideas. Some wanted the journal 4x7 in., and some 3¼x7, and they finally agreed upon 3¼x7. He thought the total length of the axle due to the distance between the collars.

Mr. WOOD was present at the meeting of the Master Car-Builders' Association at which this standard was adopted. Some fifty different lengths of axle and sizes of journal were submitted at the time. The great difficulty was to get a uniform length of axle, the samples varying as much as five inches. Having fixed the length of axle between the outside collars at 6 ft. 10 in., the size of journal was adopted. Some favored 4x8 in., and from that down to 3¼x7. By a compromise 3¼x7 was finally fixed upon. For the wheel-seat, diameters varying from 4¼ to 5 in. were recommended. The size was increased to that adopted because of the number of failures of axles inside of the collar. The weight of the standard axle finished was 345 lbs. on the average. The weight was reduced a few pounds on the Harlow and New York Central roads by some modification; but about 345 lbs. will be the weight of the Master Car-Builders' standard axle, finished.

Mr. CARSCADIN (Chicago, Rock Island & Pacific) was opposed to the adoption of the standard recommended. All his breakages had been inside of and close to the hub of the wheel. He had never had a journal broken, and had never heard of one's breaking. His journals run till 8 in. and even 2¼ in. in diameter and 6 in. long. They generally turn the axle down about ½ in. and leave a shoulder, which seems to stop the vibration, and the axle breaks right there. In fitting axles he should leave a shoulder to shove the wheel against. He should not for a moment consider the adoption of the proposed standard axle.

Mr. HOWARD FRY asked Mr. Wood if some reports of a difference in wear of brasses with journals of different sizes were not presented at the Master Car-Builders' meeting. They had had no information of the proportion of breakages of axles of the ordinary sizes, nor of the use of brasses of different sizes.

Mr. WOOD said there was in that Convention, as in this, a dearth of facts. He thought only ten or fifteen cases of breakages were reported with details. A few cases of breakage inside of the shoulders of the journal were reported, though on investigation he thought it was decided that they were burned off rather than broken. Some reports had shown there was a tendency to crack with the steel axle inside of the shoulder. He thought there was but one case of the breaking of a journal while in transit. Uniformity of length was a leading purpose at the Car-Builders' Convention, and was desirable even if there should be variety in the journals, which will in any case vary on account of wear. He thought that, even if they should change the standard in other particulars, they should adhere to the length recommended by the Master Car-Builders.

Mr. BROWN (Erie Railway) thought that the dimensions of the standard were deduced from the experience of the last 30 years. Thirty years ago cars with six, eight or ten tons' load were run with journals 3x4¼ in. successfully, but not with the present lubrication. Now they had to use a greater quantity of lubricator, and had to enlarge the journal to make room for it. By adopting the proposed journal they would endorse the practice of those who furnished the lubricators.

Mr. PEDDLE (St. Louis, Vandalia & Terre Haute) was pleased with the fairness of the report, but the resistance of large journals was not dwelt on enough. A case was reported of a Pennsylvania road on which an engine pulled 15 cars with large journals and 18 with small journals up a certain grade. He was satisfied that it was harder to start a train with large journals. He thought the friction in starting much greater than after velocity is attained, and the hauling capacity of engines is limited by their power to start trains.

Mr. FORNEY (Railroad Gazette) said though one member replying to the Committee's circular said he could pull more cars with small than with large journals, fifteen or sixteen others had never observed any difference, and there was a great deal of testimony that the large axles drew easier. The Committee had reported the exact testimony received, whether favorable or unfavorable to their convictions. He asked that Mr. Richards, who had used the standard axle, would report his experience with it. While the Master Car-Builders were considering this subject Mr. Garey, who has adopted the standard axle, reported an experiment with a car fitted with axles and brasses of three different sizes. The brasses were carefully weighed when put in, and after running a great distance were weighed again. Those with the small journals had lost the most in weight, the middle size a little less, and the largest size least, showing that the friction was least with the large bearing. If a large journal can be used with inferior oil, that is an argument in its favor.

Mr. RICHARDS (Boston & Providence) began using the standard axle eighteen months ago—at first on one car. It was on a line where there had been a great deal of trouble from sand and dust and hot boxes. The first car they oiled every trip, put it on double time and ran it three months. At last one of the boxes warmed, and no cause could be found at the time. They oiled it and put it on double time again, running to New York and back twice, and some time later one of the axles was taken out for a bad wheel, and it was found that a piece nearly as large as the finger had gone from the journal. They began altering the whole line, had used up the first hundred axles and begun on the second. They used cheaper oil, and had far less trouble with their boxes than before. The axles were no heavier than some others on Eastern roads. He thought the wear of boxes rather less. They had altered all but two of the cars of one line, and altered several cars for Mr. Wagner, at his request. They had two tenders also with the standard axles. He would not be tempted to go back to the old size.

Mr. GARFIELD (Hartford, Providence & Fishkill) asked Mr. Richards if he had ever tried a smaller journal on double time with a cheaper oil, to ascertain the result.

Mr. RICHARDS had used the best oil they could buy, on the smaller journals, and with it it was difficult in Summer to get the cars through. Instead of putting them on double time, they frequently had put them on half time.

Mr. FAY (Philadelphia & Erie) wished members to remember that if they should vote for the standard, it would not bind them to adopt it. The adoption of the resolution would simply give expression of the Association's idea of the value of the axle, which might lead to its adoption on new roads or under new stock. It will be inconvenient for old roads to make any change. Many roads have adopted this standard, and that fact should have weight. He had no doubt that there was a better chance of lubrication with large journals, and that was why it was adopted, not to get strength.

Mr. HUDSON (Rogers Locomotive Works), did not doubt that the size recommended was well adapted to existing requirements. It was desirable to have a standard for cars, which go from road to road, but that argument would not apply to tenders, which are kept at home. An inch of difference in size of journal is often necessary, when tenders are made to carry 2,500 or 2,600 gallons of water. You then increase the weight beyond what is safe to carry, so far as lubrication is concerned, until you get to, say, 3¼x6 in. Therefore he favored increasing the length of the journal, which necessitates increasing its diameter; otherwise the liability of breaking is increased. The diameter of wheel-seat was increased to avoid breakage at the back of the wheel. He believed 3x6 in. or 3¼x6 in. too small for the loads now carried. He remembered when four-wheeled passenger cars had 1½x3¼ in. journals. The size had been gradually increased, and he knew of



the adoption of fixed standards at different periods, which failed to become general because they did not provide for the requirements of the future. He had no doubt of the wisdom of increasing the length of journals from six to seven inches or even more.

Mr. WELLS presumed there was not much difference of opinion with regard to the size of the journal. He thought, however, that there was more iron than necessary in the proposed axle. On his road the standard journal for cars was  $3\frac{1}{4} \times 7$  in., which is smaller than that recommended, to which he had no objection.

Mr. WHITE (Evansville & Crawfordsville) had a journal  $3\frac{1}{4} \times 7$  in. on his road, which wore down to  $3\frac{1}{4} \times 16$  in. two years ago, and then broke at the inside collar. Since that time they had enlarged the diameter of journals a quarter of an inch. He agreed with Mr. Wells as to the weight of the axles. Theirs are  $4\frac{1}{2}$  in. at wheel seat and  $3\frac{1}{4}$  at center, the length about the same as that recommended. This makes the axle considerably lighter, and they answer their purpose better, their cars being lighter than on some other roads.

Mr. ROBINSON (Great Western) thought the question more important for cars than for tenders, which latter do not leave their own roads. He hoped the Convention would do nothing to disturb what had been done by the Car-Builders' Association. Until a better standard was proposed let them use the one recommended by the car-builders. It was better to have that for a standard than none at all, even if they disapprove of it. He proposed that the resolution be modified so as to read: "That this Convention regard the standard axle, as recommended by the Car-Builders' Convention, as a suitable standard for car rolling stock."

Mr. FORNEY said that the resolution proposed was substantially the same. He had no idea that a recommendation of this size would compel any one to throw away their present axles. That would be absurd. When the subject was up before the Master Car-Builders' Association returns of the sizes in use were collected, showing 72 different sizes. Any standard would be an advantage. By the adoption of the resolution new railroads might adopt the standard recommended, and uniformity would be approached in time. Now there is no standard.

The question on the adoption of the resolution recommending the adoption of the standard recommended by the Master Car-Builders' Association was then put. The President being unable to decide by the ayes and nays, a rising vote was taken, when 23 voted for and 35 against adopting the resolution, which was therefore lost.

#### ELECTION OF OFFICERS.

The next business in order was the election of officers. On motion of Mr. GRAHAM the election was postponed one year by a unanimous vote, in consequence of which the old officers continue until the next convention.

Before putting the question on postponement, the PRESIDENT said that, as he was not at present engaged in railroad business, he had thought it better that a successor should be elected. They had had no election the previous year, and he was very thankful for the honor conferred by so keeping him in office year after year.

Mr. ROBINSON (Second Vice-President) said that in a few months he would be out of railroad business, having accepted an offer to take charge of other business. He would remain a member of the Association and a master mechanic in spirit; but he thought it due to them to tell them of his change of employment before the election.

#### CLOSING BUSINESS.

A Committee on Resolutions was appointed. The report of the Committee on Assessments was read. The sum of \$750, instead of \$500 as heretofore, was voted as compensation to the Secretary, whose duties have much increased. The thanks of the Association were voted to the Trustees of the Cooper Union for the free use of the hall, and a resolution passed, publicly expressing the Association's appreciation of the eminent services in the advancement in the cause of education and science rendered by Mr. Peter Cooper, the venerable founder of the Cooper Union.

Mr. PETER COOPER expressed his thanks, and said that it would be a source of peculiar pleasure to himself and the Trustees to have the building which is devoted to the welfare of the community contribute to that end so effectually as it did by giving place for such a meeting. He then invited the members, after adjournment, to follow him through the rooms of the Cooper Union that they might see the work accomplished there.

Mr. FAY, of the Committee on Resolutions, then submitted the report, which expressed the thanks of the Association to the merchants and manufacturers of New York for the entertainments given them during the session and the excursion to be given the following day; to the press, for their reports, to the railroads, etc. It was adopted unanimously.

On motion of Mr. Coleman Sellers the following resolution was unanimously adopted:

"Resolved, That the thanks of this Association be tendered to its officers, who have labored so zealously in their respective places—a labor confined not alone to the time of meeting, but extending through the entire year, and contributing very largely to our success."

The PRESIDENT returned the thanks of the officers, and then urged the members to answer the committees' circulars of inquiry more fully than hitherto, that the committees might have time to prepare their reports.

Mr. FORNEY suggested that the Association's reports be offered for sale to non-members at some fixed price.

The SECRETARY said that this had been done during the past year, the Supervisory Committee having instructed the Secretary to charge one dollar apiece for reports furnished those outside of railroad business and not connected with the Association.

#### EXPERIMENTS WITH BOILERS.

Mr. WELLS (Jeffersonville, Madison & Indianapolis) urged the importance of investigation as to the form, materials and proportions of boilers and fire-boxes. Fuel expenses were probably greater than repair expenses, and they should know if they have reached the limit of economy, which can be ascertained only by experiments. Where there were boilers of different sizes and proportions on engines doing the same work there was an opportunity of ascertaining whether the proportions have any considerable effect on the consumption of fuel. Not enough attention had been given to this.

#### FORM OF LOCOMOTIVE TIRES.

Mr. COLEMAN SELLERS said that inquiry had been made by the Midvale Steel Works as to the Association's idea of the proper form of locomotive tires.

The PRESIDENT suggested that the manufacturer wishing the information send a circular to every member of the Association.

Mr. BROOKS (Brooks Locomotive Works) said the profile of tire would depend largely on the service it was to perform—the frogs it was to run through. In Europe, on some roads, the flange has to carry the weight through frogs, and then has to be entirely different from that used here. He had had to change the flanges of Krupp tires sent to this country. As to the shape of tire, there were about as many opinions as there were master mechanics. The Krupp tires received here could be turned to any form wanted.

Mr. HUDSON (Rogers' Locomotive Works) thought this was not correct. The form had been changed recently, and was now made with a very sharp edge—too sharp, sometimes.

On motion of Mr. Fry, it was voted that the annual report,

when published, be not sent to those members who have not then paid their dues.

The Convention then adjourned, to meet on the second Wednesday of May, 1876, in Philadelphia.

#### Moore's Rail Ratchet Drill.

The engraving on this page illustrates a tool designed for drilling the holes for fish-plate bolts in the rails without removing the latter from the track. It is attached to the rail by a clamp or brace which is hooked to the under side or flange and can be easily attached and detached. The drill is fed up by a screw and hand wheel on the drill spindle. The ratchet is so constructed that its action can be instantly reversed, and the motion of the handle will then move the drill spindle either to the right or the left. It can therefore be used to very good advantage as a wrench for screwing on or taking off the nuts of fish-plate bolts. Various forms and sizes of dies are provided to suit different bolts and nuts.

The tool is a very convenient one, and as it can be sold at a small price will be very convenient for drilling rails when fish-plates are substituted for other forms of fastening, or when the ends of rails are cut off owing to defects or fractures near the joints.

Messrs. H. S. Manning & Co., of No. 111 Liberty street, New York, are the agents for its sale.

#### Contributions.

##### Car Journal Friction.

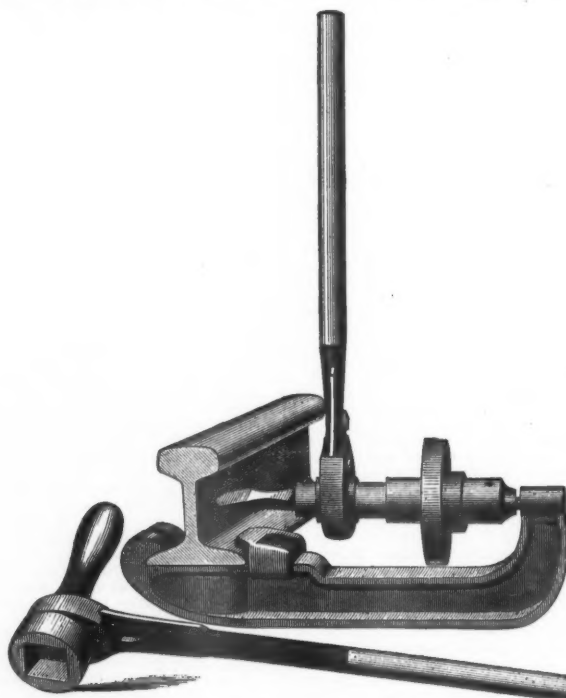
TO THE EDITOR OF THE RAILROAD GAZETTE:

The purpose of my correspondence of April 24 was not to criticize any one car-axle journal in particular, but to call your

further increase would enlarge in the same proportion the leverage of the now constant friction, and therefore diminish the effect of the journal. Wear and tear and the danger of heating, however, induce to still further reduction of the specific pressure, and this can be done without diminishing the effect of the journal, but then with disregard to strength by increasing the length of the journal. Yet increasing the length and keeping at the same time the strength necessitates of course a larger diameter. To balance the advantages and disadvantages of these different issues, to find the true relation between the diameter and the length of a car journal, is a purely practical question that experience alone could solve, and has solved long since. In establishing the length to from  $1\frac{1}{4}$  to  $2\frac{1}{4}$  times the diameter (Rules and Regulations of the Union of German Railroad Companies) the size of the journal corresponding to a given load can be properly determined, and the specific pressure in the journal will be within the proper limits.

These limits, however, within which entirely perfect lubrication is effected, are of a very wide range. The most extensive and most careful trials—to my knowledge—have been made in Hanover and Goettingen in the years 1861-62. A number of axles (wrought-iron and cast steel) and axle boxes were taken from actual service and the whole condition of the journals during the experiments was made to resemble as closely as possible that occurring in regular service. The wrought iron axles had journals  $3\frac{1}{4}$  in. by  $5\frac{1}{4}$  in. and the cast-steel axles had journals  $3\frac{1}{4}$  in. by  $5\frac{1}{4}$  in. The velocities corresponded to runs from 19 to 38 miles per hour. The journal pressures were 2,277, 4,477, 6,677, 8,877 lbs. Various compositions were tried, also various lubricants, and the result mainly touching our question was:

"The coefficient of friction is, for the limits as they occur on railroad cars, independent of the journal pressures, so that a



MOORE'S RAIL RATCHET DRILL.

attention to a correctly-stated principle quoted in the wrong place; or what does it really mean when you write the following?

"It may be said that it was shown nearly two hundred years ago that friction is, within ordinary limits, independent of the area of the rubbing surfaces in contact. These conclusions have been verified over and over again by the most careful experiments and intelligent investigators, and when a person urges seriously that the amount of friction will be increased if the surfaces in contact are enlarged, some friend should tell him confidentially that he is exposing his ignorance most lamentably."

This would sound certainly very well in a treatise on sliding friction in general, but appearing under the heading of journal friction in special, and its value on railroad rolling stock, without any further qualification, it either must mean nothing at all, or if it really does mean something, that something must be wrong. According to your quotation it would not matter whether a journal was 3 in. in diameter and 5 in. long, or whether it was 5 in. in diameter and 3 in. long. In your answer to my note I hardly could anticipate to be misunderstood. The whole tenor of my communication indicated sufficiently that—for the sake of a striking illustration—I had reference to journals 3 in. in diameter and 6 in. in diameter and not 3 in. and 6 in. in length, and that I really called up the "old objection" of the leverage of the friction being increased by increasing the diameter of the journal. My reasons for so doing I have given.

As to the additional points raised in your answer of May 1, you say:

"We gain more by the increased area of the rubbing surfaces and consequent improvement of lubrication than we lose by the leverage, owing to the greater diameter of the journal."

This is only true conditionally, as long as the pressures per unit of area are excessive.

As regards strength, short journals would be of advantage; as regards friction, subsequent heating and wear and tear, the bearing surfaces ought to be large so as to reduce the pressure per square inch of bearing surface within certain practical limits. The diameter above can be increased for this purpose with decided success as regards a reduction of friction, until the specific pressure has come within practical limits, but any

larger or smaller bearing surface of the journal has no influence on the amount of friction. (See articles in 'Organ für Eisenbahnwesen' for 1864 and the same for 1867—a short statement of which is also given in 'Zeitschrift des Vereines deutscher Ingenieure,' Vol. XII., 1868, and in the 'Handbuch für spezielle Eisenbahn Technik,' by Heusinger von Waldegg, Vol. II., 1869.)

At these trials referred to, the specific pressures for wrought-iron journals varied in round numbers from 120 to 460 lbs. For the proposed standard journal and a journal pressure of 8,000 lbs., the specific pressure is about 300 lbs. Based on the rules of the "German Union of Railroad Companies" a journal of about  $3\frac{1}{4}$  in. by  $6\frac{1}{4}$  in. would be sufficient to bear, with proper allowance for wear, a load of 8,000 lbs.; the pressure per square inch amounting to 350 lbs. I am aware that for the average American road a stronger journal would be required than for the European lines, but might this not be done by reducing its length?

Suppose we limit the specific pressure to 400 lbs.—still within experimental figures—then a journal in every respect of the same strength as the proposed standard would measure  $3\frac{1}{4}$  in. by  $5\frac{1}{4}$  in., and the saving in frictional resistance of the latter over the former would amount very nearly to 7 per cent—a figure well deserving to be considered, particularly as at the same time these heavy loads of 8,000 lbs. per journal would probably be the exception and not the rule.

NEW YORK, May 4, 1875.

OTTO GRUENIGER.

[To say that "the coefficient of friction is, for the limits as they occur on railroad cars, independent of the journal pressures, so that a larger or smaller bearing surface of the journal has no influence on the amount of friction," is simply another way of saying that "friction is independent of the area of the rubbing surfaces in contact," so that the conclusions of the German experimenters only strengthen the testimony in support of the latter statement. But both assertions are true only of the same condition of lubrication. Change the latter in any way and the coefficient of friction will be changed. Now



what we say is, that with journals having a large area of surfaces in contact the lubricant is less likely to be pressed out than with smaller areas of surfaces. That it is so pressed out is shown by the frequency of hot boxes, and that the cause is due to excessive pressure per square inch is proved by the testimony of Mr. Wells regarding his experience with heavy mail, baggage and express cars, which was quoted in the report on standard axles published in the *Railroad Gazette* May 15.

The statement of our correspondent that the friction of an axle journal  $3\frac{1}{2} \times 5\frac{1}{2}$  would be nearly 7 per cent. less than that proposed for the standard may mislead if it is not kept in mind that it is the journal friction alone of which this is true, even with the same conditions of lubrication in each case, and not of the whole resistance of the car. Probably at slow speeds the journal friction is only about half of the whole resistance, and when running fast it is much less, so that the resistance is either increased or diminished a very small proportion by the size of the journal within the limits which he names. This is very fully explained in the report on the standard for car axles.

—EDITOR RAILROAD GAZETTE.]

### A Cast-iron Car Wheel Says His Say.

TO THE ADMIRABLE CAST-IRON CROSS HEAD:

I think you ought to sympathize with me, and not try to run me down because I have a hard row to hoe: they abuse me more than they do you. When you are broken or worn out, they don't melt you over again, but put you into car castings—anything is good enough for them; but poor me, I have to be melted over four or five times, and sometimes more. Now, I have a few friends in this world. I guess you did not hear what Mr. Fox said about me before the Institute of Civil Engineers of England. Read, November 24, 1874; he says I am the wheel, I am; he says there is but one opinion among American managers about me; he also says I rarely break, I do. I outlive at least three steel wheels, he says; my flanges are soon made smooth and highly polished; he also says I run at least 100,000 miles. I am made of charcoal iron, I am, and stand a tensile strain of 18 tons to the square inch. I used to, probably, once; but I was better then than I am now—yes, a good deal better. Once in a great while some of my brothers run eighty or ninety thousand miles, but it is very seldom. If I do, it is guess-work. I had hard work of it last February and March. In February I and 114 of my brothers got through on an average 18,000 miles, and 23 of us broke down at an average of 10,000 miles. Neither did we break any one's neck. We had these car-knockers crawl all over us and feel of us. When they found us failing, they pulled us out. Well, I could not help it. My master bought me for seventeen dollars, and when I played out he sold me for ten dollars. The man that bought me melted three-quarters of me again and called me "cold-blast iron;" but I know I am not, nor ever was. But that Fox man knows all about me. He heard some one say I was good. He used me pretty rough. Before he went home he paid a guinea to some poor smith's helper to break a piece out of me. They did it, but it about played them out, for you know I resist a tensile strain of 18 tons to the square inch, I do. Mr. Starbuck, another friend of mine, says I am often safer in cold weather than the wrought-iron tire wheel. I am more homogeneous, he also says. No authority puts me less than 75,000 miles, Cross-head. If Messrs. Fox, Webb, Wordsell, and the rest of them fellows had inquired about me on some of the roads where they kept my mileage, they would have found out that some one had been stuffing them; but you see they came to this country to inquire about the American system of railroad-iron, and they confined themselves to the Pennsylvania Railroad. Now, Cross-head, you know the Pennsylvania Railroad is the only railroad in the United States. There is no Baltimore & Ohio, New York Central, Boston & Albany, Lake Shore & Michigan Southern, or Union Pacific roads. Of course not. Now, I have a cousin; he was born about seven years ago in the shape of a cast-iron wheel with a steel tire welded on it. He is called a steel-tire wheel. He is doing better than I do. I know where he has run 400,000 miles, and he has got lots of brothers that have run 200,000 miles, and are still running. So you see, Cross-head, you are not the most abused cuss that exists. Wrought iron is safer and better than you are, so you have to step down and out, and you should not grumble. I know that my cousin is stronger than I am, and is capable of doing more work than I can do, but I have the satisfaction of knowing that he has to use me in the center part of him, because I am cheaper than pig iron and just as good. But my days are numbered, Cross-head, and on the 11th of next May the master mechanics are going to talk about you and me again, and on the 10th of June I suppose the master car-builders will go for me strong. They won't say anything about you, because they don't know anything to say; but poor me, I will have to take it, because I acted so badly last February and March. I not only wore out quickly, but I broke badly. I wonder what C. D. Fox would say if he heard the discussion between some of the most practical and able master mechanics and master car-builders. I think he would say, "Oh, my hey!"

CAR WHEEL.

### Height and Panel Length of Bridge Trusses.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I would be pleased to hear an expression from engineers through your paper on a subject touched by Mr. Bender in his article on the "Springfield Bridge" in your issue of March 13; that is, height and panel length of trusses. What is the objection, if any, to trusses one-sixth the height of length, or panels from 15 to 20 feet long? I ask the objection because it is out of the general practice, and I am sure of its being economy to do so—that is in spans from 100 to 200 feet.

H. E. HORTON.

## TRAFFIC AND EARNINGS.

### Railroad Earnings.

Earnings have been reported by the following companies:

Year 1874:	1874.	1873.	Inc. or Dec.	P. c.
Flint & Pere Marquette.....	\$1,063,986	\$1,126,198	Dec. \$62,212	5%
Expenses.....	668,996	711,603	Dec. 42,606	6
Net earnings.....	\$394,991	\$414,595	Dec. \$19,604	4%
Per cent. of expenses.....	62.88	63.19	Dec. 0.31	0%
Kansas City, St. Joseph, & Council Bluffs.....	\$1,436,073	.....	.....	.....
Expenses.....	941,165	.....	.....	.....
Net earnings.....	\$494,908	.....	.....	.....
Earnings per mile.....	5,234	.....	.....	.....
Per cent. of expenses.....	65.54	.....	.....	.....
Year ending November 30:	1874.	1873.	Inc. or Dec.	P. c.
Terre Haute & Ind.....	\$1,040,878	\$1,107,358	Dec. \$66,480	6
Expenses.....	660,657	825,075	Dec. 164,418	19%
Net earnings.....	\$380,221	\$282,283	Inc. \$97,938	34%
Earnings per mile.....	9,547	10,158	Dec. 611	6
Per cent. of expenses.....	63.48	74.52	Dec. 11.04	14%
St. Louis, Van. & T. H.....	\$1,059,241	\$1,132,423	Dec. \$73,182	6%
Expenses.....	780,031	807,273	Dec. 27,242	3%
Net earnings.....	\$279,210	\$325,150	Dec. \$45,940	14%
Earnings per mile.....	5,683	7,144	Dec. 1,461	25%
Per cent. of expenses.....	73.54	71.29	Inc. 2.25	3%
Year ending March 31:	1874-75.	1873-74.	.....	.....
Concord.....	\$1,002,951	.....	.....	.....
Expenses.....	692,046	.....	.....	.....
Net earnings.....	\$310,905	.....	.....	.....
Earnings per mile.....	8,915	.....	.....	.....
Per cent. of expenses.....	68.94	.....	.....	.....
Georgia.....	\$1,231,907	\$1,571,785	Dec. \$339,878	18%
Expenses.....	826,097	1,045,307	Dec. 219,210	20%
Net earnings.....	\$405,810	\$526,478	Dec. \$120,668	29%
Earnings per mile.....	5,621	6,894	Dec. 1,273	22%
Per cent. of expenses.....	64.44	66.50	Dec. 2.06	3%
Northern (New Hamp.).....	\$636,126	\$707,760	Dec. \$71,634	10%
Expenses.....	448,618	473,526	Dec. 24,908	5%
Net earnings.....	\$187,508	\$234,234	Dec. \$46,726	25%
Earnings per mile.....	7,711	8,879	Dec. 1,168	15%
Per cent. of expenses.....	70.52	66.90	Inc. 3.62	5%
Port Royal.....	\$220,533	.....	.....	.....
Expenses.....	227,721	.....	.....	.....
Deficit.....	\$7,188	.....	.....	.....
Earnings per mile.....	1,909	.....	.....	.....
Per cent. of expenses.....	103.20	.....	.....	.....
Four months ending April 30:	1875.	1874.	.....	.....
Midland of Canada.....	\$67,543	\$74,577	Dec. \$7,034	9%
Month of March:	.....	.....	.....	.....
Union Pacific.....	\$918,963	\$687,026	Inc. \$231,937	33%
Expenses.....	327,090	417,061	Dec. 89,991	21%
Net earnings.....	\$591,873	\$269,965	Inc. \$321,908	119%
Per cent. of expenses.....	35.60	60.71	Dec. 25.11	41%
Month of April:	.....	.....	.....	.....
Western Maryland.....	\$23,328	.....	.....	.....
Expenses.....	12,615	.....	.....	.....
Net earnings.....	\$10,713	.....	.....	.....
Earnings per mile.....	259	.....	.....	.....
Per cent. of expenses.....	54.08	.....	.....	.....
Three weeks in May:	.....	.....	.....	.....
Union Pacific.....	\$820,086	\$558,875	Inc. \$261,211	46%
Two weeks in May:	.....	.....	.....	.....
Canada Southern.....	52,017	38,561	Inc. 13,456	42%
Second week in May:	.....	.....	.....	.....
Denver & Rio Grande.....	7,628	7,976	Dec. 348	4%
First week in May:	.....	.....	.....	.....
St. Louis, Iron Mt. & So.....	56,275	58,999	Dec. 2,724	4%

The following figures are made from the annual reports made to the Comptroller of the State of New Jersey, which are usually rather imperfect. They include all the roads whose earnings have not heretofore been given and are for the year ending December 31, 1874:

	Earnings.	Expenses.	Net	Earnings	P. c.
			per	per	
			mile.	mile.	
Bridgeton & Port Norris	\$24,890	\$22,270	\$2,620	\$1,244	89.4%
Ferro Monte.....	18,530	10,496	8,034	7,412	86.54
Freehold & Jamesburg.....	60,397	60,299	98	2,372	99.85
Hibernia Mine.....	48,926	12,559	36,367	8,896	25.65
Montclair.....	52,674	55,875	\$3,201	1,505	107.98
Morris & Essex.....	3,946,161	2,741,273	1,204,888	28,804	69.47
New Jersey & New York.....	161,544	111,475	50,069	7,692	69.01
Northern.....	295,054	253,563	41,491	11,348	85.94
Ogden Mine.....	41,954	19,796	22,158	4,106	47.04
Sussex.....	124,445	67,630	56,815	4,044	54.35
Tuckerton.....	36,738	23,784	12,954	1,138	64.75
West Jersey.....	623,391	475,169	148,222	4,870	76.22

### The Texas Cattle Movement.

Telegrams from Lawrence report that the first herd of the season's drive from Texas reached the Kansas Pacific at Ellsworth last week. The drive is expected to be lighter than last year, but it is thought the animals are of better quality.

### Flour and Grain Movement.

Receipts and shipments for the week ending May 15 are reported as follows, flour in barrels and grain in bushels:

	1875.	1874.	Decrease.	P. c.
Flour:				
Lake ports' receipts.....	119,456	124,691	5,235	4.1
" " shipments.....	103,713	145,043	41,330	28.5
Atlantic ports' receipts.....	169,458	210,568	41,110	19.5
Wheat:				
Lake ports' receipts.....	1,267,177	1,613,382	346,205	17.0
" " shipments.....	1,886,109	1,864,786	21,323	9.8
Atlantic ports' receipts.....	329,827	2,529,551	2,199,724	87.0
Corn:				
Lake ports' receipts.....	859,702	1,052,186	192,484	18.3
" " shipments.....	1,259,376	1,272,087	12,711	1.0
Atlantic ports' receipts.....	982,987	1,401,513	418,526	29.9
Grain of all kinds:				
Lake ports' receipts.....	2,535,566	3,169,221	633,655	16.5
" " shipments.....	3,478,238	3,922,043	443,805	11.3
Atlantic ports' receipts.....	1,542,515	4,535,555	2,992,940	64.8

Of the lake ports' shipments, 60 per cent. of the flour and 35 per cent. of the grain of all kinds went by rail.

In Chicago, for the week ending May 22, the receipts were 62,859 barrels of flour and 1,095,139 bushels of grain of all kinds this year, against 44,283 barrels of flour and 1,347,860 bushels of grain for the corresponding week last year. The shipments were 46,681 barrels of flour and 1,038,198 bushels of grain this year, against 43,668 barrels of flour and 2,596,388 bushels of grain last year. The great stock accumulated during the winter does not seem to diminish, as it usually does on the opening of navigation, but the shipments are only about as great as the receipts.

### Foreign Wheat Production.

The total exports of wheat and flour from Russia, by land and sea, for the nine years ending with 1872 were an average of 50,788,000 bushels per year, and for the last three years of this period they were, respectively, 64,104,170, 73,889,850, and

61,262,502 bushels. Last year's crops, it is thought, will leave a surplus of 51,000,000 bushels for export.

The Hungarian crop for 1874 affords a surplus for export estimated at the widely different figures of 12,000,000 to 20,000,000 bushels.

It is estimated that the British demand from March 27 to Sept. 1, which last year absorbed about 38,000,000, this year will require but 9,500,000 bushels—one-quarter as much.

The French Government reports the wheat crop of France in 1874 at 350,000,000 bushels—the largest on record and 95,500,000 more than the average consumption of that country, and more than the total wheat and flour exports of the United States in 1874, which, reducing flour to wheat, amounted to about 82,500,000 bushels, and were larger than ever before. The surplus of France, apparently, was sufficient to supply the wants of all other European countries, without calling on Russia or America, and there will evidently be a large amount of the crop of 1874 to compete with the coming harvest.

### Cotton Movement.

The growth of the cotton receipts at Norfolk is shown by the following table of receipts for the nine crop years (ending with August) since the war:

Year.	Bales rec'd.	Year.	Bales rec'd.
1865-66.....	69,096	1870-71.....	302,930
1866-67.....	126,287	1871-72.....	284,730
1867-68.....	155,591	1872-73.....	405,412
1868-69.....	164,749	1873-74.....	472,446
1869-70.....	178,942	.....	.....

For the last year the receipts were about one-eighth of the crop of the United States. The proportion is quite kept up this year. Cotton does not go to Norfolk for export however. Most of its receipts are shipped to New England and other Northern ports for domestic consumption. The growth in the exports is large, however, they having grown from 8,282 bales in 1872-73 to 20,346 in 1873-74, and having reached about 60,000 bales during the past eight months of the current crop year. The growth of this traffic is due chiefly to the Atlantic, Mississippi & Ohio and the Seaboard & Roanoke railroads and their connections, which have more and more diverted cotton from the routes which reach the sea by shorter lines at more Southern ports. It is questionable, however, whether this traffic when fully developed will go to any seaport. Having got so far north as Richmond it is likely, at some time, to continue its route by rail to the interior Northern cities which manufacture it.

Southern receipts for the week ending May 21 were 18,372 bales, against 23,678 last year, and from Sept. 1 to May 21 they were 3,379,385 in 1875 and 3,651,358 bales in 1874. The exports for the crop year have been 2,399,382 bales, against 2,641,006 last year.

New Orleans shows a large decrease and Mobile a considerable increase in their proportions of cotton receipts, but elsewhere there is not much change, as this table of the percentages of receipts at each of the leading ports for the two years shows:

	1874-75.	1873-74.
New Orleans.....	28.8	31.7
Mobile.....	9.4	8.0
Charleston.....	12.7	11.6
Savannah.....	17.3	17.4
Galveston.....	10.5	10.5
Norfolk.....	11.7	12.0
New York.....	4.0	8.0

### Coal Movement.

The coal tonnages reported for the week ending May 15 are as follows:

	1875.	1874.	Inc. or Dec.	P. c.
Anthracite.....	284,535	434,793	Dec. 150,258	34%
Semi-bituminous, Broad Top and Clearfield.....	21,937	.....	.....	.....
Cumberland.....	61,603	.....	.....	.....
Bituminous, Western Penn.....	25,852	.....	.....	.....
Coke, Western Penn.....	11,314	.....	.....	.....

The strike in the Clearfield region has come unexpectedly to an end, but the resumption of work will be delayed in many mines by the wide-spread forest fires that have done much damage throughout that country.

There is no change to report in the strikes in the Schuylkill anthracite region, but there is some talk of a resumption of work in the Lehigh region.

The Pennsylvania Railroad reports tonnage for the first week in May as follows:

	1875.	1874.	Inc. or Dec.	P. c.
Coal, bituminous.....	50,835	.....	.....	.....
" anthracite.....	15,548	.....	.....	.....
Coke.....	11,269	.....	.....	.....
Total.....	77,652	.....	.....	.....

### Lake and Canal Navigation.

The Sault Ste. Marie Canal was opened May 14 this year—the same as last year.

Canal rates are quoted at 8 cents for wheat and corn from Buffalo to New York. The reduction in tolls amounts to a cent a bushel.

### Expenses of Canal Boats.

The following, taken at Buffalo, is from the testimony before the New York committee which investigated terminal charges:

Mr. Jacob Shaver, of the firm of A. S. Carpenter & Co., was called and sworn, and submitted the following as a fair exhibit, with, perhaps, some trifling exceptions, of the expenses of shipping grain to New York by canal, as proved by actual experience:

	Boat, C. F. Sternberg, 1874.
July 15—To tolls on 7,900 bu. wheat.....	\$252 50
July 15—Insurance, \$38 50; trimming, \$9 51; tugs, \$3.....	51 81
July 15—175 feet warp, \$15 75; 35 bu. corn, \$25 20.....	40 95
July 15—Commission, \$24 76; cards, 10c.; powders, \$1; limit.....	27 61
ment, \$1 76.....	15 96
July 16—Hay, \$13; shoeing, \$2 46; 31 wharfage, \$50.....	58 00
July 20—To river towing down, \$30; Aug. 1, up, \$25.....	55 00
July 31—To elevation, \$58 74; short, 17 41-100 bu. at \$1 22, \$28 66.....	85 40
July 27—To stabling at West Troy, \$7 75; Aug. 19, blocks, 50c.....	8 26
Aug. 19—To sawdust, \$1 15; sundries, 45c; oats, \$1 10.....	3 00
Aug. 19—Sick horse, \$5 65; repairs, 25c; toll up, etc., \$12 02.....	17 92
Aug. 19—Wharfage, 2 25; stabling at Buffalo, \$1 38.....	3 63
Aug. 19—Shoeing, \$2; painting boat, \$10.....	12 00
Aug. 19—Captain's services, 27 days, to Aug. 19, 1874.....	162 60

This shows the expenses to have been very nearly nine cents a bushel; and last year the price paid was rarely more than that, and often less.

### The Monongahela Bridge Letting.

A Pittsburgh dispatch of May 20 says: "The contract for the new suspension-bridge over the Monongahela river at the junction with the Ohio, at this city, was awarded to the American Bridge Company, of Chicago. The competition in this job was lively, all the most prominent builders in the country being represented. The contract price is \$401,250, and the structure is to be finished by next summer. The principle adopted is the stiffened chain, and the plan followed was that prepared by Mr. Hemberle, engineer of the bridge company. The main span is to be 800 feet, with a height of eighty feet above low-water mark. Each link of the suspension chain will measure twenty feet in length. The work is to be begun on the substructure immediately, the contract for that job being sub-let to John Megraw, of Allegheny City."





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## Editorial Announcements.

**Addresses.**—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

## STEEL FOR LOCOMOTIVE FIRE-BOXES.

The discussion of this subject by the Master Mechanics' Association, a full report of which is published in our numbers of this and last week, will, we believe, attract more attention than all the other proceedings of the Master Mechanics' Convention of this year. It presented such unequivocal testimony, showing the extent of the evil to which reference had already been made in an editorial article published in the *Railroad Gazette* of May 8, that there can no longer be any hesitation in acknowledging its existence. This evil is the cracking of steel plates in locomotive fire-boxes. It is immaterial whether steel is more or less liable to crack than iron (a point, by the way, which was not clearly determined by the discussion). As iron plates are liable to blister, the question for consideration is really whether the tendency to blistering and cracking of iron is greater or less than that of the cracking alone of steel plates. This would be established satisfactorily only by a careful collection of statistics, such as is not likely to be made through the instrumentality of the Master Mechanics' Association, as it would probably reveal too many unwelcome facts and unwholesome truths.

It is doubtful, however, whether the discussion and investigation of this subject will assume the form of that kind of inquiry. The advantages of steel over iron in strength, ductility and homogeneity are so very great that mechanical engineers and steel manufacturers are quite certain to endeavor to find some cure for the fragility of steel plates, and if iron should be substituted for steel it will doubtless be only a temporary expedient to remedy the evil.

A week before the discussion of the Master Mechanics' Association, Mr. William Menelaus, manager of the great Dowlais Iron Works, in his inaugural address as President of the British Iron and Steel Institute, made a speech in which he described the extension of the use of steel for boiler plates in England. We copy this part of his speech elsewhere. In it is said that of nine or ten thousand steel plates made at Bolton, three-fourths have been used for boilers; that with a tensile strength of 30 to 34 tons these plates are safely worked by experienced men; that steel boilers have served nine years, giving perfect satisfaction and requiring lighter repairs than iron boilers. Mr. Adamson, an eminent mechanical engineer, has used no other than Bessemer steel for boiler plates since its introduction; has made between six and seven hundred boilers of this material, mostly for high pressures, finds the steel plates very uniform in quality, and has had most satisfactory results from their use in fire-boxes; there is no blis-

tering, and the plates show great endurance; he planes the edges of his plates and drills the rivet holes after they are bent and in place.

Messrs. Galloway, of Manchester, famous for their good boilers, found the Bessemer boiler plates first tried, in 1861, too hard; of late they have used steel plates extensively and conclude that, when the annealing is carefully performed, the plates are perfectly trustworthy.

It will be seen that there is no reference to the cracking of fire-box plates, which in this country has been so prolific a cause of trouble and expense. It will also be observed—a fact to which we have heretofore called attention—that Bessemer plates are almost exclusively used by our English friends for boilers. In this country we do not know of any Bessemer steel being now in use.\*

A very marked characteristic of the discussion to which we have referred was the contradictory character of the testimony which was given. Mr. Setchel, for example, showed that some of the steel became brittle by use, and that a piece taken from a cracked plate "broke into three or four pieces when tapped with the hammer." A piece taken from the same plate became tough and ductile by being annealed. Pieces taken from other cracked plates showed no signs of brittleness, and pieces of a steel plate which were cut from a plate by Mr. Boon, of the Fort Wayne road, before and after it had been in use on an engine for three years and seven months, during which time the engine ran 120,432 miles, and which were then tested by Prof. Thurston, showed that the material had increased in ductility by use. Another specimen of steel presented by Mr. Setchel, which was taken from a plate in a fire-box which had run 74,874 miles, "was in the same condition as when taken from the fire-box, cut out of the plate and doubled down cold. If a nicer piece of steel could be found he would like to see it. The engine had been in the house 24 hours when the plate cracked." The cause of cracking can, therefore, not always be attributed to the brittleness of the material.

Another very curious contradiction was presented by the experiments of Mr. Peddle and Mr. Hayes. Mr. Peddle took a steel plate 12 inches square and 5-16 in. thick and heated and cooled it seven times, each heating being from seven to eight hours long. The result was that he shortened the plate  $\frac{1}{4}$  inch through the center. In other words, the edges of the plates became concave in outline. Mr. Hayes took a plate  $9\frac{1}{2}$  inches square, "heated it six times to a cherry red and cooled it off suddenly in water. He found that over the edges it had shrunk just one-fifteenth of its size (3-16 inch), while across the metal it retained the original size." In other words, Mr. Hayes' plate became convex on the edges, whereas that experimented upon by Mr. Peddle became concave. The difference in the treatment was that the one was heated and cooled suddenly, whereas in treating the other the heatings continued for seven or eight hours each. This singular result may have been caused by accident, error of observation or possibly an error of the report of the experiments; but if it can be established conclusively that the effect of slow heating and cooling is to cause so very great a difference in the form of contraction or distortion, it is a very singular fact. We would suggest to some of the members of the Association that they take two new steel plates as large as practicable, but of exactly the same size and kind of steel, and heat the one slowly and maintain the heat for 10 or 12 hours, and then allow it to cool slowly during the night, and repeat the heating the next day, and so on continuously for say six days or more, and measure the distortion each day. The other plate to be heated to the same heat, but as quickly as possible, and cooled suddenly, noting also the change in form for each heating and cooling. The same experiment should also be made with two plates taken from an old fire-box which has been in use for a number of years, to see whether an equal amount of contraction will take place and whether it will assume a similar form to that of the new plates. Such an experiment would indicate to us whether it might not be well to apply the annealing process repeatedly to advantage. From the known effect of slow cooling upon car-wheels, glass and other substances, it seems probable that the effect is to equalize the strains through the material, and that this will be more effectually done if the process is repeated oftener than once. That more or less change does take place in the physical structure of cast iron by repeated exposure to heat is shown by the well known experience of master mechanics with the double-seat poppet throttle-valves now so commonly used on locomotives. No matter how accurately these are ground down to their seats when new, they are very sure to leak when exposed to the heat of steam; but if they are again ground down after the engine has been in service some time, there is usually little trouble thereafter. This indicates that frequent heating and cooling of the

\* A very curious instance is, however, related of a set of stationary engine boilers which were made of some of the early Bessemer plates in one of the Eastern cities. These plates were shipped to St. Louis, and were unloaded on the levee at that city and laid on the damp sand near the river, where they were exposed to the rays of the hot sun. After being there some time it was found that both boilers were cracked from the expansion of the upper plates by the heat of the sunshine.

cast iron has a tendency to equalize the internal strains of the material, and to some extent change its form. This process probably continues until all of what may be called the abnormal strains in the material are relaxed, and its form thereafter becomes fixed. If a similar action takes place in steel fire-box plates, it would be indicated by the distortion of the new plates by repeated heating and the unalterable form of the old plates under the same treatment. If this should be the case, then probably the evil complained of could be cured by repeated annealing, thus allowing the disturbance in the form of the plates to occur before they are put into the boiler instead of after.

Another very singular fact was indicated by the members who reported that very little trouble was experienced from the cracking of the steel fire-boxes of engines which had first been used for burning wood. This experience was confirmed by a number of others besides those who took part in the discussion. This fact inculcates the obvious lesson that the fuel used in engines with new steel fire-boxes when they are first put into service should be wood.

It was also stated by some of those who took part in the discussion that more difficulty is experienced with heavy, fast-running passenger engines than with those employed in freight service, and that the cracks in the fire-box plates were nearly always in a vertical direction. We simply give these facts as symptoms or phenomena of the disease, without any intention of indicating their significance. There are, of course, other phenomena which should be carefully observed, and which may be of very material aid in discovering the cause and providing a remedy for the evil. It is of the utmost importance to know the chemical constituents of the metal, both before and after it has been used. Doubtless, too, the form and staying of the boiler have much to do with the strains to which the fire-box plates are subjected. Altogether, the subject is likely to receive more attention and careful investigation during the next year than it has ever received before.

## LOW CANAL TOLLS.

The New York Legislature has decided to reduce the tolls on the Erie Canal from three to two cents a bushel. The reduction was clamored for by the canal men and the merchants of New York. The former had a wholly unprofitable season last year, with a large traffic; and this season opening with no prospect of so large a traffic and still sharper competition by the railroads, the owners of Buffalo elevators and of canal boats, and those otherwise interested in canal traffic, saw no possibility of a paying business unless their expenses could be reduced. The New York merchants found their business much lighter than last year, and the traffic of some other seaports, Baltimore especially, larger instead of smaller. Of course it is to their advantage that their chief channel to the Western grain fields should continue to be much cheaper than any other. It has always been the cheapest and is still, and has become much cheaper within two years past; but meanwhile the rail rates have been reduced still more in proportion; and the railroads extend to Boston, Philadelphia and Baltimore as well as to New York. Two great and powerful interests thus pressed for a reduction of tolls with such weight that the representatives of the State yielded, though they have but recently shown that the expenditures on the canals have largely exceeded their receipts for some time past, and that a reduction in the earnings would deprive the State of any prospect of the means needed to improve these water courses. And, in view of the competition of the railroads and the probability that they might carry most of the grain if the old tolls should be maintained, perhaps this policy was a wise one, though it should result in much smaller receipts than last year and an income insufficient to maintain the canal. For it is better that the canal should earn something under tolls inadequate to its needs than that it should earn nothing under tolls which would support it if it was possible to get the old amount of traffic.

But the reduction of tolls has been spoken of as a measure likely not simply to save the canals from a loss of business, but to so increase it as to largely make up for the reduction in the rate and secure to New York undisputed supremacy in the grain export trade. It is probable that many will consider the experiment to have failed unless the canal carries at least as much grain as last season, and New York City receives as large a proportion of the whole amount of grain received at seaboard cities.

Now, we believe that all hopes of any such event are doomed to disappointment. The canal will carry less grain than last year, though the tolls are lower by a third; and though New York may hold its relative position as a grain market, the canal tolls this year will have had little to do with it. The canal will carry less grain because there is less to be carried: not less perhaps of that which Northwestern farmers have produced and would like to sell, but less of that which European countries want and will pay for. As for the domestic consumption, except that in places on the canal itself, the railroads have carried the grain for that so long that the canals are not likely to divert it from them, even



should there be no tolls. So far this calendar year the sea-board receipts of grain have been about a seventh less than last year, and, unless there should be a bad harvest in Europe this summer, the proportion is likely to be no larger hereafter. Then the railroads are carrying lower than ever before, and their rates seem to have a decided effect; for this year of the eastward shipments of Western lake ports for the second week of May, navigation being fairly open, no less than 35 per cent. was taken by the railroads to 65 per cent. by lake; while last year for the corresponding week less than 24 per cent. went by rail. It will not do to make the hasty deduction that this proportion will be continued throughout the season; because this was the second week of lake navigation. During the first week, however, (but the canal was not open then) the railroads carried about 40 per cent. of these eastward shipments; and in favor of their continued success in this traffic is the fact that they have had to compete thus early in the season with lake rates as low as the usual mid-summer rate of a cheap year. It hardly seems that they are ever likely to meet with stronger competition from the present water routes, and that the ground they gain now will not again be taken from them without their consent, unless canal transportation shall be greatly cheapened in some way. The reduction of the canal toll, thus, brings the railroads into competition with the lowest water rates ever levied, lower, probably than can be permanently maintained. If vessel and boat-owners tell the truth, the continuance of the present freights will destroy their business; and the canal reports indicate that the canal can hardly be maintained by the reduced toll; though a reform in canal affairs may tell a different story. There may still be some reductions in terminal charges, as there have been already, we believe, but all these, except such as may be made at Buffalo, are as much to the advantage of the railroad as of the canal grain traffic; and on the whole it seems that the railroads are now experiencing the most formidable competition possible from the present water ways.

Their success in meeting this competition is likely to appear greater than it will be in reality. They may indeed carry a larger proportion of the grain moving to the sea-board than ever before, but this cannot properly be called success, unless they carry it at a profit. Probably they are now—some of them, at least—carrying at a loss; and the taking of the traffic from the canals on these terms is a "success" which the railroads can hardly boast of.

The season's business, however, is likely to give an opportunity to experiment with the grain traffic pretty thoroughly; to learn how far grain may be diverted by extremely low rates; how nearly railroads can compete with canals working at bare cost; and how low grain can be carried in the large quantities which the low rates will draw to the railroads.

We have often said that it is questionable whether the railroads would be benefited by the monopoly of the grain traffic which now moves by water. And under ordinary circumstances we probably should not see them bidding for it so eagerly. This is not the traffic for which they have enlarged the roads and rolling stock; but they nevertheless have enlarged their capacities at a time when pressed by a profitable traffic, expecting to employ them in similar profitable business. Not finding the looked-for increase, they have been tempted to take any traffic to fill their cars at almost any price needed to secure it. Their competition is no more normal than that of the water route. It is not likely to make any considerable permanent change in the course of traffic, but it will be a test of the railroads' capacity as carriers of grain for export such as they have hardly had before.

#### Erie Insolvent.

Last Wednesday, May 26, on application of the Attorney General of the State of New York, probably with the consent and perhaps at the instance of the directors of the company, "having regard solely to the best interests of the people of this State and of the creditors of the said corporation," the Supreme Court of the City and County of New York appointed Hugh J. Jewett, then President, Receiver of the Erie Railway Company, with instructions to file with the Court a complete inventory of the property received, to work and maintain the road, and otherwise conduct the business of the company, pay as soon as possible all debts due to laborers and other employees incurred during the four months preceding the order, and those for current supplies incurred within the same time; with power to redeem securities now pledged for loans, and to borrow money for any of the above purposes, and for current working expenses, and to report to the Court all receipts and disbursements every three months. He is forbidden to pay interest on any bonds without further orders from the Court, and all the trustees of mortgages are enjoined from bringing any action against the company without such further orders.

The late statement of President Jewett sufficiently foreshadowed some occurrence like this. When it was published, however, it was understood that the company could borrow the money necessary to meet its June coupons by

#### RAILROAD EARNINGS IN APRIL.

Name of Road.	Mileage.					Earnings.					Earnings per Mile.	
	1875.	1874.	Inc.	Dec.	Per c.	1875.	1874.	Increase.	Decrease.	Per c.	1875.	1874.
Baltimore & Ohio.....	1,276	1,070	206	.....	19½	\$1,412,527	\$1,377,954	\$34,573	.....	2½	\$1,107	\$1,288
Canada Southern.....	452	452	.....	.....	.....	111,468	79,970	31,498	.....	39½	247	177
Central Pacific.....	1,293	1,260	33	.....	2½	1,355,000	1,110,623	244,377	.....	22	1,046	881
Chicago, Danville & Vincennes.....	157	157	.....	.....	.....	66,628	45,628	21,000	.....	46	424	291
Denver & Rio Grande.....	120	120	.....	.....	.....	32,356	29,613	2,743	.....	9½	269	247
Illinois Central.....	1,106	1,106	.....	.....	.....	586,716	586,962	.....	.....	\$246	529	529
Indianapolis, Bloomington & Western.....	344	344	.....	.....	.....	100,767	140,334	39,567	.....	28½	293	408
Indianapolis, Cincinnati & Lafayette.....	171	171	.....	.....	.....	142,362	151,750	9,388	.....	6½	796	843
International & Great Northern.....	456	407	51	.....	12½	85,255	70,482	14,773	.....	20½	186	173
Mobile & Ohio.....	527	521	6	.....	1½	109,711	134,954	25,243	.....	18½	209	259
Rockford, Rock Island & St. Louis.....	288	288	.....	.....	.....	76,154	69,934	6,220	.....	13½	264	222
St. Louis, Alton & Terre H., Main Line.....	191	191	.....	.....	.....	86,948	100,283	13,335	.....	13½	446	514
St. Louis, Alton & Terre H., Branches.....	71	71	.....	.....	.....	40,207	41,093	886	.....	2½	565	578
St. Louis, Iron Mountain & Southern.....	685	685	.....	.....	.....	258,570	230,434	28,136	.....	12½	377	336
St. Louis & Southeastern.....	349	349	.....	.....	.....	85,935	93,996	8,061	.....	8½	246	269
Union Pacific.....	1,032	1,032	.....	.....	.....	1,062,953	834,954	227,999	.....	27½	1,050	809
Totals.....	8,535	8,339	296	.....	3½	\$5,613,557	\$5,092,978	\$520,579	.....	10½	\$658	\$618
Total increase.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

#### RAILROAD EARNINGS, FOUR MONTHS ENDING APRIL 30.

Name of road.	Mileage.					Earnings.					Earnings per mile.				
	1875.	1874.	In.	Dec.	Per c.	1875.	1874.	Increase.	Decrease.	Per c.	1875.	1874.	In.	Dec.	Per c.
Central Pacific.....	1,293	1,260	33	.....	2½	\$4,339,000	\$3,645,648	\$693,352	.....	19	\$3,356	\$2,893	\$463	.....	16
Denver & Rio Grande.....	120	120	.....	.....	.....	103,022	92,195	10,827	.....	11½	859	768	91	.....	11½
Illinois Central.....	1,106	1,106	.....	.....	.....	2,182,596	2,250,426	67,830	.....	3	1,968	2,029	61	.....	3
Indianapolis, Bloom. & Western.....	344	344	.....	.....	.....	418,883	572,619	153,736	.....	26½	1,218	1,665	447	.....	26½
Indianapolis, Cin. & Lafayette.....	171	171	.....	.....	.....	522,886	567,441	44,555	.....	7½	2,921	3,170	249	.....	7½
International & Great Northern.....	456	401	55	.....	14½	425,048	399,735	25,313	.....	6½	928	967	39	.....	6½
Mobile & Ohio.....	527	521	6	.....	1½	692,862	817,197	124,335	.....	17½	1,325	1,569	244	.....	17½
St. Louis, Alton & T. H. main line.....	191	191	.....	.....	.....	321,711	387,707	66,996	.....	20½	1,650	1,988	338	.....	20½
St. Louis, Alton & T. H. branches.....	71	71	.....	.....	.....	202,501	161,665	40,836	.....	25½	2,862	2,277	585	.....	25½
St. Louis, Iron Mt. & Southern.....	685	681	4	.....	0½	1,085,465	934,006	151,459	.....	16½	1,585	1,372	213	.....	16½
St. Louis & Southeastern.....	349	341	8	.....	2½	340,468	413,253	72,785	.....	17½	970	1,184	208	.....	17½
Union Pacific.....	1,032	1,032	.....	.....	.....	3,061,699	2,750,586	311,113	.....	12	2,986	2,665	321	.....	12
Totals.....	6,362	6,236	126	.....	1½	13,616,138	12,992,689	\$623,449	.....	4½	\$2,140	\$2,075	\$65	.....	3½
Total increase.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

hypothecating its coal lands to two great coal roads. On examination, however, these companies refused to make the advance on the security offered, which probably was covered by prior claims. Thus the company had no longer any hope of meeting its maturing engagements.

We confess, however, that we do not understand the appointment of a Receiver at the suit of the State. Of course, the bondholders have not yet any ground for an action against the company, for the company has not yet failed to fulfill its contracts with them. The order of the Court would seem to give the floating-debt creditors of all kinds, except those whose claims have been due more than four months, priority over bondholders. This priority always exists with the claims for labor and other claims which have a mechanics' lien, but any extension of this priority to other floating debt seems a violation of the rights of the bondholders.

Indeed, since the company is to be insolvent, it seems to us that its property should go as soon as possible into the hands of its bondholders, who alone have such an interest in it as is likely to lead to the proper management, maintenance and improvement of the property. The stockholders should have the sharp alternative of advancing the money to pay the floating debt and improve the road, or of losing all property in the road. Judging from their management hitherto—that is, the acts of those who have appeared to control the stock—they deserve no particle of sympathy; almost from its first days, the chief use made of the stock of this company, and the control of its administration has been for disreputable speculations, some of which were little better than schemes for plundering credulous English investors. Indeed, the overgrown capital account has hardly left a possibility of making an honest income by means of dividends, while it has afforded unusual facilities for making vast profits on the Stock Exchange by shrewd combinations. When the company is finally reorganized, we hope its stock will be in the hands of those of its present creditors who will expect dividends from it and will manage the property to that end.

Mr. Jewett, doubtless, will be an able and impartial receiver. His disposition of the company's earnings, however, will of course be determined by the order of the Court whose servant he now is. Just what is aimed at by the action in which the receiver is appointed we do not yet know.

#### Axle Breakages in Germany.

Twenty-nine German railroads report that in the course of the year 1873 the whole number of axles which broke on them was 145, of which 11 were locomotive, 33 tender, 12 passenger-car and 89 freight-car axles. In 1872 there were 185 axles broken on the same roads; in 1871, 186; and in 1870, 132. There was one axle broken to 1,041 running on the roads in 1873, one to 696 in 1872, one to 592 in 1871, and one to 776 in 1870. In 1873 the number of breakages in the six colder months (68) was less than in the six warmer months (77). But the winter was exceptionally mild, and in the very cold winter preceding it there was an exceptionally large number broken.

The average life of these broken axles varied on the different roads from 4 years, 9 months and 25 days to 25 years, 5 months

and 13 days, and their average service from 9,456 miles to 406,515 miles. Taking the whole number together, the average time of service of the broken axles was 11 years, 3 months and 21 days, and the average mileage run before breaking was 100,132. This average mileage run before breaking for each class of axles for four years has been:

	1873.	1872.	1871.	1870.
Locomotive axles.....	167,435	129,508	123,015	160,936
Tender axles.....	140,794	151,854	173,412	146,924
Car axles.....	74,496	99,951	101,594	112,998

Here the progress seems to have been backward except in locomotives. The decline in the mileage of car axles is referred to numerous breakages of new axles in consequence of running while heated.

The greatest mileage run by a locomotive axle before breaking was 274,362 miles by a coupled axle on the Emperor Ferdinand Northern Railroad; the greatest mileage of a tender axle was 248,369; of a passenger-car axle, 406,515; and of a freight-car axle, 315,379.

The material of part of these axles is named.

It is shown in the following table:

	Wrought iron.	Puddled steel.	Bessemer steel.	Cast steel.
Locomotive axles.....	8	1	0	2
Tender axles.....	28	0	1	4
Passenger-car axles.....	10	0	0	3
Freight-car axles.....	63	18	1	7
Total.....	109	19	2	15

Of the whole number of breakages, 43.5 per cent. occurred at full speed; 36.6 per cent. at a reduced speed, and 19.3 per cent. were first noticed while at rest.

One hundred out of the whole 145 caused no damage; 4 caused a simple derailment without other damage; 29 caused damage to rolling stock, and 12 damage to rolling stock and road. Sixteen cars were destroyed, and 74 more or less damaged by these accidents.

Seventy-seven of the axles broke in the journal, 26 inside of the wheel seat, 24 within the wheel itself, 14 about the middle of the axle, and 4 were broken more than once.

The causes of breakage are reported as follows: 36.5 per cent. on account of ordinary wear; 28.9 per cent., various causes not determined exactly; 14.5 per cent., running hot; 14.5 per cent., bad material; 2.8 per cent., bad fitting of the axle; 2.1 per cent., derailment, and 0.7 per cent., bad construction.

In comparison with the previous year the number of axles broken on account of wear has considerably diminished, which has its cause in the greater care of certain companies in removing old axles. The report says: "If this course is continued, a further decrease in axle breakages may safely be expected, especially as in 63 of the broken axles old cracks were found in places easily seen. Generally the number of breakages which could not have been avoided or prevented was small; for the selection of a good material suitable for axles is not very difficult, and running hot and removing worn axles too late are causes which may be avoided."

These data are contained in a report made to the German Railroad Union by the direction of the Emperor Ferdinand Northern Railroad of Austria, and is a specimen of the work done for that Union. It is quite an elaborate document, consisting chiefly of tables comparing in every possible way the statistics of breakages which the several roads had returned.

#### A Case of "Tin-Pan" Engineering.

An iron highway bridge recently fell down in Lehigh County, Pa., apparently of the kind which is built only where no engineers are consulted, whereupon some person wrote to the *Albion Democrat*, to say that iron bridges are generally unsafe and inefficient. A communication signed "Engineer," and



dated Bethlehem, April 5, published in the same paper, disposes of this statement as follows:

"Your issue of the 24th of March contains an article upon bridges in which the relative value of the various kinds of material generally used in such structures is discussed, and in which iron bridges, without exception, are placed in the lowest rank, as structures of little or no value, as compared with those built of stone or wood. The article in question was called forth by the recent break-down and total wrecking of a bridge at Bittner's Corner, nominally, but not in fact, an iron bridge. It is certainly not just that an art, which at the present time is claiming the attention of the best engineering skill of the country, should be brought into disrepute by such a miserable apology for the thing it claims to be. The idea of spanning a stream seventy feet wide with a bridge capable of sustaining with safety a moving load of say several tons only, with weight of material used in its construction amounting to two tons or less, is so manifestly ridiculous that it is surprising that three men could be found within the limits of Lehigh County willing to accept this structure and present it to the public as an evidence of their good judgment and official fitness. I am free to say that the bridge in question was the poorest of its class, and should never have been opened for public use. Quite a number of so-called iron bridge structures have been erected in this section during the last ten years, many of which cannot stand the test of scientific scrutiny. These structures have been palmed upon the public by unscrupulous agents and incompetent officials, and the limit of their existence will be as the area of their section. As far as I know there are several bridge structures only, the property of the county, that can lay claim to the name of iron bridges. It is needless for me to say that the bridge spanning the Lehigh at Allentown is one of them. The others are joint bridges, spanning the Monocacy Creek near Bethlehem. These structures, if properly protected from the action of the elements by a judicious application of paint, will stand for ages, and will, after the lapse of a century, be as well preserved and as useful as bridge structures then, as they are to-day. They will stand as monuments to the durability of iron long after wood has decayed and passed away, and stone shall have crumbled into dust."

"Engineer" certainly hits the nail on the head when he says that such structures "have been palmed off by unscrupulous agents and incompetent officials." There are numbers of highway bridges erected yearly throughout the country which are utterly inadequate to stand the tests required of such structures, and would never be accepted by any competent engineer, and usually are never accepted by any engineer. The town authorities announce that they want a bridge which will meet certain requirements; but they do not know what such a bridge is, and they assume that all those offered do meet those requirements, for to consult an engineer seems never to occur to them. Reputable bridge-builders present plans to meet the requirements at a price that will cover the cost; disreputable or ignorant bridge-builders present plans that will not meet the requirements at prices much lower than the cost of an efficient structure. Those who have the letting of the bridge, not being capable of discriminating between engineering designs, are attracted by the low prices, and the reputable builders stand no chance in the competition. It is as if bids should be asked for gold medals, and brass ones should be accepted. Honest builders continually find their bids rejected in favor of some design which does not nearly meet the conditions specified by those who let the work, and a protest is useless, as it is considered as a fling at a rival, having no better foundation than selfishness and jealousy. To compete under such circumstances is almost hopeless, and is certainly very disgusting, as many of our builders have found.

#### Steel Boilers in England.

In his address on taking the chair as President of the British Iron and Steel Institute, Mr. William Menelaus, Manager of the Dowlais Iron Works in South Wales, and said to be "perhaps the most practical iron worker in the world," spoke as follows of English experience with steel boilers. His remarks have a peculiar interest in this country in view of the recent discussion of the Master Mechanics' Association on this subject:

Mr. Sharp, of Bolton, was one of the first to produce excellent boiler and ship plates of steel, and to make boilers of steel plates. Mr. Sharp tells me that they have made between nine and ten thousand tons of steel plates at Bolton, three-fourths of which have been used in the construction of boilers. He says that steel plates, with a tensile strength of from 30 to 34 tons, are easily and safely worked by experienced men. They have had steel boilers at work for nine years, and they have given perfect satisfaction, and the repairs are light as compared with those of iron boilers. Mr. Adamson, whose talents as a mechanical engineer are well-known to us all, informs me that in his steam engines, when the choice of materials is left with him, all the principal parts are made of Bessemer steel, and that the results have been most satisfactory. Mr. Adamson states that he has used various kinds of steel in boiler work, but since the introduction of Bessemer steel plates he has used no other; of this material he has made between six and seven hundred boilers, mostly for high pressures. He is now making a number of steel shell and fire-box boilers, of seven feet diameter, to work to 80 lbs. and 100 lbs. pressure per square inch. Mr. Adamson has used mostly steel plates of Barrow make. He says that they are very uniform in quality, and from all causes he has not had to return or set aside more than one plate in a thousand. He describes his method of working steel plates as follows: "A piece is cut off every plate and tested before the plates are accepted; the edge of the plates, when used for boilers, are all planed, the rivet holes are drilled through both plates together, after the plates are bent and in place; in every case double or chain riveting is adopted." He goes on to say: "In the application of steel plates for fire-boxes, I have experienced the most satisfactory results; there is no blistering, and the plates show great endurance. When boilers have been allowed to run short of water, the plates have bulged or collapsed, but they never fractured." In this respect, he thinks that steel plates are superior to any iron ever made. Mr. Adamson, like Mr. Sharp, advocates the use of steel of comparatively low tensile strength, from 30 to 32 tons per square inch. Steel of 38 to 40 tons to the inch was found quite unsuitable for boiler work; it was found wanting in ductility, and the use of such a material was quickly abandoned. A great deal has been said and written about the want of uniformity in Bessemer steel, but what could be more satisfactory than Mr. Adamson's experience on this head? Messrs. Galloway, of Manchester, who have a large experience in boiler-making, and who are noted for the excellence of their work, inform me that when they commenced using Bessemer steel plates, about 1861, the results were not satisfactory, the plates being too hard; but that of late they have used steel plates extensively, and that the conclusion they have come to is, that when the annealing is carefully performed the plates are perfectly trustworthy; in fact, in the testing of boilers they now find

quite as little trouble with steel plates as with iron ones, if not less. They state further that careful annealing has a most beneficial effect; and they refer to some experiments made for the Manchester Boiler Insurance Company by Mr. Kirkaldy on the strength of riveted joints, which conclusively proved that even in the case of wrought-iron plates which are punched it is advisable to anneal them.

#### The British Railway Commission.

We find frequent reports of cases tried before this Commission in the English papers, and recently most of these cases have been disputes between railroad companies, chiefly growing out of the interpretation of old contracts for interchanging traffic, maintaining rates, working branches, etc., all of which would have been tried in the ordinary courts but for the establishment of the Commission, with vastly greater delays and much less satisfactorily.

Indeed, it is probable that the Commission's most valuable service has been and will be hereafter as an arbitrator between railroad companies, though it has done some good work in adjusting complaints of shippers against carriers. And its value to the road proprietors seems to be acknowledged, not only by the frequent resort to it, but by expressions of those interested in railroad property. An instance of this is the following extract from "Bradshaw's Railway Manual" for 1874, recently issued:

"Contributing to the same desirable end of economy consequent upon peace with neighbors, the new Railway and Canal Commission promises to operate with more than anticipated potency. An interest which has grown up as it were bit by bit, and under the provisions of various acts of Parliament, and of numerous interlocking agreements enacted at different times, the provisions of which are often found to be contradictory and irreconcilable one with another, is necessarily liable to occasional differences. In theory the courts of law are open to disputants in such cases, but we all know how expensive and dilatory the process is found to be. The want of a tribunal with summary jurisdiction to determine questions as to the rights of railways between each other, and as between railways and the public, with the least possible delay and at the least possible expense, was all but universally admitted. Such a tribunal we have in the Railway Commissioners, and so effectually has it, up to the present time, performed its work, that the Government board, at whose instance it was established, and by whom its members were selected, will be accorded credit by railway shareholders, as well as by the public, for this measure, whatever may have been its shortcomings in other respects."

It will be remembered that the law establishing this Commission requires that one of its members shall be a man experienced in railroad affairs, and another learned in the law, and that for the first named the person selected was one who had been many years General Manager of one of the great English railroads. The Commission thus is able to understand at once questions which the most learned and intelligent bench of judges would grasp only after long and labored explanations, and then only imperfectly. Then the treatment of a single class of cases in time gives all the members, including those without previous railroad experience, a familiarity with the facts and principles, which vastly facilitates their deciding justly, and, what is of only less importance, deciding promptly. The decisions, so far as we have noticed, usually come within a week of the hearing.

#### Record of New Railroad Construction.

This number of the *Railroad Gazette* has information of the laying of track on new railroads as follows:

**Hanover & York.**—On the southern section the track has been extended northeastward 4 miles to Spring Forge, Pa., nine miles from Hanover; and from the northern terminus at York southwestward 5 miles.

**Rusk Railroad.**—This light railroad is completed from the International & Great Northern at Jacksonville, Tex., southeastward 12 miles to Rusk.

This is a total of 21 miles of new railroad, making 250 miles completed in the United States in 1875, against 427 miles reported for the same time in 1874 and 827 in 1873.

THE FRENCH RAILROAD GUARANTEES paid by the Government amounted in the ten years ending with 1872 to \$55,000,000, varying from \$300,000 in 1863 (but never less than \$3,000,000 after that year) to \$12,500,000 in 1870. The contract of the State with the railroad companies, made about 1858, makes it for the interest of the latter to expend all the capital possible in new lines and improvements of the old ones whenever they can sell bonds guaranteed by the Government above a certain price. If the expenditure is unfruitful the Government pays the interest and sinking fund of the bonds and enables the company to collect and divide an amount which is proportional to the whole capital expended. That is, the divisible income of the railroad is made larger by any authorized expenditure of new capital, whether the works absorbing the capital return any profit or not. The consequence is that when money is cheap, the companies eagerly undertake very costly lines which carry very little traffic; and the only limit to railroad extension at such times seems to be the Government's authorization, which is not readily given, though it is given to many unpromising schemes.

APRIL EARNINGS are given for 16 companies, several of which do not usually report. The result is quite favorable, there being an increase of 6½ per cent. in the average earnings per mile. The Baltimore & Ohio shows a decrease of 14½ per cent. in earnings per mile, but this is doubtless due to the large increase in new road, which might be doing very well with half the average earnings of the old lines. Chicago, Danville & Vincennes does credit to its late receivers by reporting an increase of no less than 46 per cent. Indianapolis, Bloomington & Western, on the other hand, shows a decrease of 28 per cent. It is a road which depends largely on the maintenance of through rates, and was to such a road in these days.

## General Railroad News.

### ELECTIONS AND APPOINTMENTS.

**Detroit & Bay City.**—At the annual meeting recently the following directors were chosen: C. C. Fitzhugh, Bay City, Mich.; J. I. North, Vassar, Mich.; C. K. Carpenter, Orion, Mich.; L. Woodward, Rochester, Mich.; James F. Joy, Detroit, Mich.; H. H. Hunnewell, Isaac Livermore, N. Thayer, W. F. Weld, Boston.

**Chicago, Danville & Vincennes.**—The United States Circuit Court has appointed Mr. A. Anderson, formerly Vice-President of the Toledo, Wabash & Western, Receiver in place of Messrs. J. B. Brown and H. B. Hammond, removed.

**Missouri, Kansas & Texas.**—At the annual meeting in Parsons, Kan., May 19, the following directors were chosen: Benjamin P. McDonald, C. H. Pratt, H. C. Cross, of Kansas; Robert E. Carr, Adolphus Meier, Thomas J. Bartholomew, St. Louis; E. Corning, Thomas J. Agnew, Wm. H. Guion, Eliza Riggs, George Bliss, N. L. McCready, H. C. Dickinson, New York. This is an entirely new board, and it is understood that its election is the result of an agreement between the first mortgage bondholders and other creditors and the stockholders. It is also understood that Mr. Robert E. Carr, of the Kansas Pacific, will be President.

**Cairo & Vincennes.**—Mr. Charles H. Cory has been appointed Master Mechanic.

**Wheeling, Pittsburgh & Baltimore.**—At the annual meeting in Washington, Pa., May 3, the following directors were chosen: J. B. Hayes, C. M. Reed, W. W. Smith, Wm. Workman, Washington, Pa.; W. S. Bissell, Pittsburgh, Pa.; J. B. Ford, Wheeling, W. Va.; Wm. Keyser, Baltimore. The board re-elected C. M. Reed, President; J. B. Washington, Secretary; W. H. Ijams, Treasurer; R. T. Devries, General Agent; J. L. Randolph, Chief Engineer. The road is controlled by the Baltimore & Ohio.

**Delaware & Bound Brook.**—The board has re-elected E. C. Knight, President; James H. Stephenson, Secretary and Treasurer; Francis H. Sailor, Chief Engineer.

**Shenandoah Valley.**—The trouble in this company has been compromised by the retirement of both the rival boards chosen at the recent meetings and a new election of Wm. McLellan as President, with the following directors: Logan Osburn, Chas. Aglionby, Wm. H. Travers, Wm. D. Smith, A. R. Boteler, U. L. Boyce, M. B. Buck, Henry B. Harnsberger, William Milnes, Jr., Mann Spitzer, John Kelley.

**Poughkeepsie, Hartford & Boston.**—The bondholders who bought the Poughkeepsie & Eastern road at the foreclosure sale have organized a company by this name, and have chosen the following directors: E. L. Beadle, George R. Gaylord, George Innis, Michael J. Myers, George P. Pelton, Alanson Swain, J. G. Whitehouse, John F. Winslow, Poughkeepsie, N. Y.; E. L. Bolles, New York.

**Hoosac Tunnel Line.**—Mr. J. Prescott has been appointed Manager of the Hoosac Tunnel and State road by the Governor and Council of Massachusetts. He was formerly, for a great many years, Superintendent of the Eastern Railroad.

**Central Vermont.**—At the annual meeting in St. Albans, Vt., May 19, the following directors were chosen: J. Gregory Smith, W. C. Smith, St. Albans, Vt.; Joseph Clark, Milton, Vt.; John B. Page, Rutland, Vt.; Jacob Esty, Brattleboro, Vt.; Lawrence Barnes, Burlington, Vt.; B. P. Cheney, Francis Cox, Jacob Edwards, Boston; G. M. Rice, Worcester, Mass.; J. Q. Hoyt, New York. This ticket, which is substantially the old board, was chosen by a vote of 10,749 to 9,000 for an opposition ticket which omitted the Smiths and several others, and substituted some of the Vermont & Canada directors. This ticket was supported by the Page or Rutland interest. It is claimed that there was an illegal issue of stock, and the election will be contested.

**Port Royal.**—At the annual meeting in Port Royal, S. C., May 5, Mr. D. C. Wilson was chosen President, with the following directors: D. F. Appleton, H. R. Cook, Wm. Elliott, George Gage, W. F. Herring, George Holmes, J. P. King, B. W. Lawton, M. Politzer, R. E. Robbins, Josiah Sibley, George Waterhouse.

**Maryland & Delaware.**—The Maryland Board of Public Works has chosen Wm. Satterfield, Edward Lloyd and Samuel Hambleton State directors.

**Queen Anne's & Kent.**—Dr. Washington Finley, Wm. McKenney and Col. John R. Emory have been chosen Maryland State directors.

**Kent County.**—Col. D. C. Blackiston, Wm. Stevens and W. S. Walker have been chosen Maryland State directors.

**Philadelphia & Baltimore Central.**—John Keavary, of Cecil County, has been chosen Maryland State director.

**Annapolis & Elk Ridge.**—The Maryland Board of Public Works has chosen as State directors Henry Aisquith, N. E. Berry and Augustus Gassaway, all of Anne Arundel County.

**Baltimore & Ohio.**—The Maryland Board of Public Works has appointed the following State directors in this company: Israel M. Parr, James A. L. McClure, George Colton, Baltimore; Hon. John Carroll Walsh, Harford County.

**Worcester & Somerset.**—John P. Hargis has been appointed Maryland State director.

**Dorchester & Delaware.**—James A. Stewart and Edward Goslin have been chosen State directors.

**Worcester.**—Dr. John T. Hammond and L. R. Purnell have been chosen Maryland State directors.

**Eastern Shore.**—The Maryland Board of Public Works has chosen Wm. S. Parsons, Wm. H. Roach and Dr. Wm. H. Gale State directors.

**Wicomico & Pocomoke.**—Gen. H. Humphreys, Col. L. L. Dickinson and Wm. Howell have been chosen Maryland State directors.

**British Iron and Steel Institute.**—At the annual meeting of this society in London, May 5, 84 members were elected, of whom the following were Americans: William F. Durfee, Superintendent Milwaukee Iron Works, Milwaukee, Wis.; James J. Hagerman, Secretary Milwaukee Iron Company, Milwaukee; Gen. John T. Wilder, Superintendent Roanoke Iron Works, Chattanooga, Tenn. The number of members is now 832. The Institute also honored itself by choosing the venerable Peter Cooper, of New York, an honorary member, with six others including F. Krupp, of Essen, and Schneider, of Creusot. The only honorary member previously was the King of Belgium.

**American Society of Civil Engineers.**—May 12 the following were declared elected members: Francis W. Bacon, Boston; Robert Forsyth, Chicago; Wm. H. Faine, Brooklyn; and the following Juniors: Geo. H. Baxter, New York; John C. Bland, Philadelphia; George A. Kimball, Somerville, Mass.; Mansfield Merriman, New Haven, Conn.; John G. Speed, Louisville, Ky.; Henry W. Stuckle, New York. The hour for the regular meetings of the society was changed from 1 to 8 p. m.

**United New Jersey.**—At the annual meeting in Trenton, N. J., May 25, the old board of directors was re-elected as follows: William G. Cook, Benjamin Fish, John G. Stevens, Robert F. Stockton, Trenton, N. J.; Ashbel Welch, Lambertville, N. J.; A. L. Dennis, Nehemiah Perry, Newark, N. J.; Isaac W. Scudder, Jersey City, N. J.; Samuel Welsh, Philadelphia; John Jacob Astor, Cambridge Livingston, New York; Hon. Hamilton Fish, Washington. The State director is Mr. Charles A. Butts.



of Burlington, who holds over from last year, the Legislature having held no joint meeting this year.

**Erie.**—Mr. Hugh J. Jewett, President of the company, has been appointed Receiver by the New York Supreme Court.

**Pacific Mail Steamship Company.**—At the annual meeting in New York, May 26, about 96,000 shares were voted on and the following directors were chosen without opposition: Sidney Dillon, Geo. S. Scott, Jay Gould, Jas. D. Smith, Chas. J. Osborn, Geo. J. Forrest, Rufus Hatch, Oliver Ames, John Riley. This is substantially the present board.

**Boston, Concord & Montreal.**—At the twenty-ninth annual meeting in Plymouth, N. H., May 24, the old board of directors was re-elected, as follows: Alexander H. Tilton, Tilton, N. H.; Joseph P. Pitman, Laconia, N. H.; John L. Dix, Milford, N. H.; Joseph W. Lang, Meredith, N. H.; Peter Butler, John E. Lyon, John A. Parks, Boston.

**Boston & Maine.**—Mr. Levi L. Lincoln, late Superintendent of the Maine Central, has been appointed General Agent of this road, and will have charge of all its business over the Maine Central and its connections. He has authority to contract for transportation of freight and passengers from any point on the Maine Central and connecting roads to any point on the Boston & Maine or its connections. His headquarters will be at Augusta, Me.

#### THE SCRAP HEAP.

##### The Smith Locomotive Truck Patent.

The Locomotive Engine Safety Truck Company has filed a bill in equity in the United States Circuit Court for New Hampshire against the Manchester Locomotive Works for an alleged infringement of the patent of Alba F. Smith for an improvement in locomotive trucks, which is owned by the company.

##### Railroad Manufactures.

The Fitchburg Machine Company of Fitchburg, Mass., recently shipped a number of machine tools for the shops of the Havana Railroad in Havana, Cuba.

The Dunbar Furnace, at Dunbar, Fayette County, Pa., has in use a slag granulator, and the granulated slag is taken by the Pittsburgh, Washington & Baltimore road, for ballast, we believe.

The name of the Union Iron Company, of Chester, N. J., has been changed to the North Jersey Iron Company.

The Columbus (O.) Rolling Mills are turning out a lot of rails for the Indianapolis, Bloomington & Western.

The iron rail mill of the Joliet (Ill.) Iron & Steel Company has resumed work after a stoppage of 18 months.

The Harrisburg (Pa.) Patriot says: "The Pennsylvania Steel Company has increased the capacity of the works at Baldwin so largely that now about 1,000 tons of rails are manufactured weekly, over twice as much as at the corresponding period last year. The two furnaces being erected, in addition to the one in operation, will not be able to furnish the necessary pig iron, about 200 tons being used up daily. Of anthracite coal from 90 to 100 tons are consumed at the steel works per day. On Saturday a cargo of 500 tons of steel rails was shipped. Twelve new brick houses (possibly twenty), of handsome design, will be erected during the summer for the accommodation of the superintendents and other employees of the steel works." The company has a large order for rails for the Southern Pacific road.

The Pittsburgh American Manufacturer says: "The wooden sides of the shops of the Keystone Bridge Company are being removed and brick ones substituted, the roof being propped up while the process goes on. When the walls are completed a corrugated iron roof will be put on the present iron girders."

The Chattanooga (Tenn.) Commercial of May 20 says: "Pursuant to a decree rendered by Chancellor Key on Monday, the Vulcan Works will probably be sold some time during the coming summer. The sale will be subject to two mortgage liens, amounting in the aggregate to about \$100,000, and will probably result in the works being purchased and put in operation by the holders of these liens." The mill has been in operation about eight years; it makes merchant bar, light rails and fastenings, besides bolts, car axles and other forgings.

An exchange says: "A result of the settlement of the difficulties between the puddlers of Troy and the proprietors of the Reneselaer Iron Works has been that 1,000 men resumed work on Wednesday. The strike had been in progress 32 weeks. An advance of 32 cents per ton for puddling was made by the proprietors, the price now being \$4.25 per ton. All differences are now being settled. A disgraceful act marred somewhat the harmony of the occasion. Seven non-union men who had quit took occasion to leave the city by train. While they were waiting for the train, the mob of union men heeled stones at them and wounded some of the passengers of the train upon its arrival."

The Bethlehem (Pa.) Iron Works have an order for 5,000 tons of steel rails for the Southern Pacific Railroad of California.

The Ohio Falls Car Works, at Jeffersonville, Ind., have contracted to furnish a complete equipment of cars for the Chicago, Millington & Western narrow gauge road. The same shops are building some passenger coaches for the Indianapolis, Bloomington & Western.

The Paterson Press says that many of the small creditors of the Grant Locomotive Works are assigning their claims and uniting in the general creditors' agreement. The large creditors have already done so.

The Rogers Locomotive Works has an order for several engines for the Central Railroad of New Jersey.

The Centennial Board of Finance has let the contract for building an iron bridge 500 feet long across Belmont ravine, and leading into the Horticultural Building in Fairmount Park, Philadelphia, to the Watson Manufacturing Company of Paterson, N. J.

##### Production of Steel.

At the meeting of the Iron and Steel Institute, it was stated that the productive power of the steel works of Europe and America is not less than 2,150,000 tons per year, of which England can supply 750,000 tons.

##### Low Priced Stock.

The town of Cherry Valley, N. Y., has some years held \$150,000 (par value) stock in the Cherry Valley, Sharon & Albany Railroad Company, for which town bonds were issued. Recently this stock was ordered to be sold by the town, and a purchaser was found who paid for it the sum of \$2, being 1-750 of 1 per cent. on its par value.

#### PERSONAL.

—Mr. David Salomon, Financial Agent in New York for the Pennsylvania Railroad Company, died in that city May 21.

—Gen. Wm. Larimer, late of Kansas, but formerly of Pennsylvania, died at his residence in Leavenworth, Kan., May 16. He was at one time Treasurer of the Ohio & Pennsylvania Company, afterwards merged in the Pittsburgh, Fort Wayne & Chicago, and also President of the Pittsburgh & Connellsville. He was an active man and for many years was a prominent politician.

—Mr. Kennedy, late Chief Engineer of the Great Western of Canada, has been appointed Engineer in Charge of the new harbor works at Montreal.

—Capt. George C. Dickinson, late Division Engineer on the Baltimore Short Line Railroad, has been appointed City Engineer of Portsmouth, Ohio.

#### ANNUAL REPORTS.

##### Atlantic & Gulf.

This company owns and operates the following lines:

	Miles.
Main Line, Savannah, Ga., to Bainbridge, including extension to wharf in Savannah, 2 miles.....	239
Albany Division, Thomasville, Ga., to Albany.....	59
Florida Division, Dupont, Ga., to Live Oak, Fla.....	48
Total.....	346

The line is part of the only railroad connection between East and Middle Florida and the North, and it carries the local business of a large part of South Georgia with competition at a few points only. Much of the country which it serves, however, is thinly populated and not very productive. The company purposes extending its main line westward from Bainbridge to a connection with the Mobile & Montgomery at or near Pollard, Ala., but nothing has been done towards this during the year, owing to unfavorable circumstances.

The equipment consists of 25 engines; 19 passenger and 8 baggage, mail and express cars; 219 box, 117 platform, 11 stock cars and 1 log truck; 4 service cars and 1 steam pile-driver car. During the year one engine has been condemned; two passenger, 6 box and 3 stock cars were built to replace old ones, and one platform car and a steam pile-driver added to the equipment, which has generally received necessary repairs and been kept in good condition.

The expenses of the Road Department have been increased by a large expenditure for new rails, 1,500 tons of 56-pound rails with fish joints having been put in the track against 700 tons in 1873. There were also used in repairs 122,685 ties and 1,523,929 feet of lumber, and 1,174 feet of new sidings laid. The Zero bridge, 130 feet long, was rebuilt, the bridges over Great and Little Ogeechee and Flint rivers partly renewed. The Savannah River wharf has been extended 78 feet, and a new road with two bridges built to connect it with the city streets. A gravel train was constantly employed clearing out cuts, widening the road-bed and ballasting the track.

At the close of the year the capital account stood as follows:

Capital stock.....	\$3,693,200 00
South Georgia & Florida guaranteed stock.....	786,476 69
Total stock (\$12,947 per mile).....	\$4,479,676 69
Bonded debt (\$5,596 per mile).....	2,974,200 00
Common notes and free bonds (\$1,597 per mile).....	552,500 00
Due bills used as currency (\$222 per mile).....	76,800 00
Bills payable (\$507 per mile).....	175,264 19
Total (\$23,869 per mile).....	\$8,258,440 88

This is exclusive of the ordinary current accounts. During the year \$335,352.96 was paid for interest on bonds and notes and the 7 per cent. dividends on the guaranteed stock. The company holds \$76,300 in various bonds and stocks.

For the year ending December 31 the earnings and expenses were as follows:

	1874.	1873.	Inc. or Dec.	P. c.
From freight.....	\$738,802 83	\$740,469 81	Dec..	\$1,666 98 0 1/2
Passengers.....	195,501 51	199,577 35	Dec..	4,075 84 2
Mails.....	26,266 00	33,438 70	Dec..	7,172 70 21 1/2
Incidentals.....	71,685 82	32,461 26	Inc..	39,224 56 120 1/2
Total earnings.....	\$1,032,256 16	\$1,005,947 12	Inc..	\$26,309 04 2 1/2
Administrative expenses.....	27,590 08	29,875 46	Inc..	6,714 62 32 1/2
Roadway.....	253,197 63	227,476 97	Inc..	25,720 66 11 1/2
Locomotive.....	182,384 81	180,322 28	Dec..	2,062 53 1 1/2
Car.....	87,930 26	95,680 08	Dec..	7,749 82 8 1/2
Transportation.....	168,025 55	180,574 06	Dec..	12,548 51 7
Forwarding.....	6,051 66	7,260 53	Dec..	1,208 87 16 1/2
Work's expenses.....	\$725,179 99	\$712,189 38	Inc..	\$12,990 61 1 1/2
Extraordinary expenses.....	6,880 53	37,242 31	Dec..	30,361 78 81 1/2
Total expenses.....	\$732,060 52	\$749,431 69	Dec..	\$17,371 17 2 1/2
Net earnings.....	\$300,195 64	\$256,515 43	Inc..	\$43,680 21 17
Gross earnings per mile.....	2,983 40	2,907 36	Inc..	76 04 2 1/2
Net earnings per mile.....	867 62	741 32	Inc..	126 30 17
Per c. work's exp.....	70.25	70.80	Dec..	0.55 0 1/2
Per c. total exp.....	70.92	74.58	Dec..	3.66 4 1/2

There was a considerable falling off in the receipts on business from the Macon & Brunswick road, owing partly to competition and partly to low rates. There is also a loss in the Chattahoochee River business, owing to its diversion to other points, the business of that section tending more to Macon and Atlanta every year. There has been a steady increase in local freight receipts, which are now 75 per cent. of the whole. There is also an increase in local passenger receipts.

The work done was as follows:

	1874.	1873.
Passengers carried.....	103,921	97,227
Cotton carried, bales.....	121,410	128,402
Lumber carried, feet.....	38,784,929	45,286,180
Engine mileage.....	651,900	653,918
Passenger-car mileage.....	1,744,642	1,629,862
Freight-car mileage.....	5,500,703	6,127,557
Service-car mileage.....	448,865	407,335

Foreign cars made 242,174 miles, against 456,415 in 1873. The average earnings of the daily express passenger trains were 66 1/2 cents per train mile, against 60 1/2 cents in 1873. The average number of passengers carried was 102 to 96 in 1873; average receipts per passenger, \$2.33 1/2 to \$2.24. On the whole passenger business, with an increase in the number carried, there has been a decrease for several years in the average fare paid, indicating an increase in the local passengers. Some of this is also referred by the report to the increased tendency to trade with Macon or Atlanta rather than Savannah, the local traffic tending to the former places passing over a shorter distance on this road than that to Savannah. The great bulk of the cotton still comes to Savannah as a point of export.

#### OLD AND NEW ROADS.

##### Baltimore, Pittsburgh & Chicago.

It is reported that work will very shortly be begun on the Pittsburgh end of this road, and that it will be built from Pittsburgh as far as Youngstown, O., about 60 miles. At Youngstown connection can be secured with Cleveland, and over the Atlantic & Great Western road westward.

The merchants of Erie, Pa., recently held a meeting and appointed a committee to confer with the Baltimore & Ohio directors with reference to securing a branch from this line to Erie. Such a branch would also serve a large oil-producing section.

##### Pittsburgh, Washington & Baltimore.

A special meeting of the stockholders was to be held May 26, to consider the purchase by the Baltimore & Ohio Company of the interest in the road now held by the city of Baltimore, and to consider the agreements and mortgages necessary to be made to complete that purchase according to the terms of the ordinance authorizing the transfer.

##### New York & Long Branch.

The tracklayers are at work from Red Bank, N. J., westward and from South Amboy eastward, the latter party having

reached Chesapeake. As soon as they meet, they will be put to work on the unfinished section between Middletown and Long Branch. The superstructure of the Haritan River bridge is nearly completed, and the road will be ready for traffic early in June.

##### Little Rock & Fort Smith.

Surveys are being made for the extension from the present terminus west to Fort Smith, Ark. A line is to be run on each side of the Arkansas River. The road must be completed by June 7, 1876, in order to save the land grant.

##### Franklin Telegraph.

It is authoritatively announced from Boston, that the lease of the property of the Franklin Telegraph Company to the Atlantic & Pacific Telegraph Company was annulled, May 22, and canceled by agreement of the parties thereto. This action replaces the lines of the Franklin Company, between New York and Washington, and also the exclusive connection with the new ocean cable at Rye Beach, N. H., in the hands of its former managers. The petition of the stockholders for the appointment of a receiver and a sale of the property, in consequence of alleged frauds on the part of the Atlantic & Pacific Telegraph Company, which owns a majority of the capital stock, was to be heard before Judge Morton, May 28.

##### Central Vermont.

At the annual meeting, May 19, there was a sharp contest between the Smith or St. Albans party, headed by J. Gregory Smith, and the Page or Rutland party, headed by Governor Page. The ticket of the latter had on it the names of Bradley Barlow, F. A. Brooks, R. A. Hoyt, and one or two others of the Vermont & Canada directors. The Smith ticket was finally chosen by 10,749 votes to 9,000, but the defeated party claims that this result was only secured by an extraordinary and unwarranted issue of new stock, made just before the election, and in order to carry it. The new issue consisted of 600 shares to Lansing Willis, the Superintendent of Traffic, and 1,750 to J. R. Langdon, one of the Smith directors, and is claimed to have been made without consideration. In answer to questions it also appeared that a meeting of directors had been held the day before on a car of the train from Bellows Falls to St. Albans, at which inspectors of election were appointed and the board voted to resist the demand made for the surrender of the Vermont Valley road, June 1, and to borrow money to meet the payments due to the Vermont & Canada. One of the Boston directors protested against the extraordinary and irregular character of the meeting. A protest was made against counting the votes cast on the new stock, and the matter will be carried into court.

##### The Hoosac Tunnel Fast Freight Line.

A new fast freight line under this name, to run from Boston to the West by way of the Hoosac Tunnel, is being organized by the Fitchburg, the Troy & Boston, the New York Central & Hudson River and other companies. Offices are to be established at all the leading points, and a number of companies have agreed to put cars in it. It will be, we believe, what is known as a co-operative line.

##### Evansville & Crawfordsville.

This company is building several new depots along the line. A considerable quantity of new steel rails and many new ties are being put in the track, and the freight yard at Terre Haute is to be much enlarged.

##### Baltimore & Ohio.

This company paid into the Maryland State Treasury, May 18, the sum of \$24,229.81, being the passenger tax on the Washington Branch due the State under the recent decision of the United States Supreme Court.

The fare between Baltimore and Washington has been cut down by both lines to 50 cents for a single fare or 75 cents for the round trip, which is a very low rate. The distance is 40 miles by one road and 43 by the other.

For some time the mails from Washington to New York have been divided between this road and the Baltimore & Potomac, and the Baltimore & Ohio postal car has continued to run through, although its other cars did not. The Pennsylvania Railroad Company has, however, given notice that after June 1 this Baltimore & Ohio car will not be allowed to go beyond Philadelphia.

The Commissioners of the District of Columbia have withdrawn the permission granted the company to build a new depot on the site purchased by it some time ago. The reasons given are that it is too near the Capitol and that it will make it necessary for the tracks to be laid across Massachusetts avenue, to the detriment of that street. The Commissioners have notified the company that they will allow the depot to be built anywhere north of Massachusetts avenue.

##### Iowa Railroad Law.

The Executive Council of Iowa has agreed upon the following classification of the railroads in the State, in accordance with the law regulating rates—a subject now attracting renewed interest, since the recent decision of the United States Circuit Court, affirming its constitutionality:

Class A—Chicago & Northwestern; Chicago, Burlington & Quincy; Chicago, Rock Island & Pacific; Illinois Central; Keokuk & Des Moines; Chicago, Clinton & Dubuque.

Class B—Central Railroad of Iowa.

Class C—All other roads, except the Burlington, Cedar Rapids & Minnesota, which is not yet placed, a legal question having arisen with the Council, which has been referred to the Attorney General.

##### Vermont & Canada.

Chancellor Barrett has refused to grant the temporary injunction to prevent the transfer of the stock to the trustees named by the Central Vermont. The main bill in the case is held for a hearing, but will not come up until December.

##### Atchison Bridge.

The caisson for the third pier has been successfully sunk, and the work on the pier is progressing. The caisson for the fourth pier is ready to put in place. The iron work for the superstructure has already begun to arrive, and the work of putting up the turn-table and draw-span will soon be commenced.

##### Valley, of Ohio.

The President, Mr. King, has returned from England, having been for the present unsuccessful in negotiating the bonds of the company there. The matter was, however, left in good hands, and it is said there is a prospect that further negotiations will be successful.

##### Evansville, Terre Haute & Chicago.

The American Express Company has withdrawn from this road, and President Collett announces that until further notice the railroad company will do its own express business.

##### Toledo, Wabash & Western.

This company has completed arrangements for running the trains of its Pekin, Lincoln & Decatur Branch into Peoria, over the Peoria & Springfield track, but some delay may be caused by the opposition of the Indianapolis, Bloomington & Western, noted elsewhere.

Mr. K. H. Wade, Superintendent of the Eastern Division, has removed his headquarters to Fort Wayne, Ind., where the division offices will be hereafter located.

##### Chicago, Milwaukee & St. Paul.

The stock books were closed last week, and it is reported that the Mitchell party has secured a large majority of the proxies



for their plan of removing Russell Sage and N. F. Cowdrey from the directory and making the term of directors one year instead of three, as now. The Sage party, as far as appears, has made no efforts to defeat this action.

#### Cincinnati Southern.

The trustees have let to Messrs. Harmon & Shanahan, of Staunton, Va., the 12 sections in Kentucky which were recently advertised. Most of it is heavy work.

#### Kansas Pacific.

A contract has been let for grading 20 miles of road westward from Las Animas, the present terminus of the Arkansas Valley Branch. The iron for 60 miles is ordered. This move is undoubtedly caused by the commencement of work on the extension of the Atchison, Topeka and Santa Fe, west from Granada.

The company has agreed to build the shops of the Denver & Boulder Valley and the Colorado Central in Denver, and to change the line of the latter road to 3 feet gauge, where it is now of the standard. The city agrees, on its part, to exempt the railroad land now within the city limits, or that shall hereafter be included within said limits, from taxation, and from being opened and crossed by any street or alley, as long as the same shall be used for railroad purposes. But in case the said exemption should prove to be illegal, then the said city promises and agrees to pay all the taxes assessed, or to be assessed, upon said property. The committee reported favorably upon the contract.

#### Sunbury & Lewistown.

It is stated that the owners of this road, which has been lying idle since the Pennsylvania Railroad Company gave it up last January, are making arrangements to operate it again. If arrangements cannot be made for the use of the Northern Central track from Selingsgrove to Sunbury, a new track will be built between those places. It is also intended to build a short branch to Port Trevorton, to connect with the Reading road.

#### Burlington & Southwestern.

Gen. N. B. Baker, who was appointed Receiver by the United States Circuit Court, has taken possession of that portion of the road lying in Missouri. That portion in Iowa is still in the possession of the Receiver appointed by the State Courts. Gen. Baker will make an effort to get possession of the entire line.

#### Chicago & Pacific.

The stations on the new extension from Elgin west to Byron, with the distances from Elgin are: Pingree's Grove, 7.8 miles; Hampshire, 13.8; Genoa, 22.3; Kirk, 30; Monroe, 36.5; Rockford Junction, 42.5; Stillman Valley, 47; Byron 51.3.

Regular trains are now running to Byron and are said to be doing a good business. The line is being surveyed westward from Byron, and work will shortly be begun on the bridge over Rock River at that place.

#### The Illinois Tax on Capital Stock.

In the case of the Peoria, Pekin & Jacksonville Company, the United States Circuit Court has granted an injunction restraining the payment of the taxes assessed on the capital stock. The complainant is required to give bonds in double the amount of the tax and pay the tax assessed against the tangible property of this road on the valuation made in its return of its property to the assessor.

#### Texas & New Orleans.

The present owners of this road have formally accepted the provisions of the act passed by the late Legislature of Texas, which requires them to go to work at once and rebuild the road from Houston to the Sabine River.

#### Milwaukee & Dubuque.

The village of East Troy, Wis., has voted \$30,000 in aid of this road. Votes are to be taken in other towns on the line.

#### Atlantic & Great Western.

The suit of the United States Rolling Stock Company against this company to recover rental due has been withdrawn, the matter having been settled by a compromise, as was stated in the Rolling Stock Company's last annual report.

#### Memphis, Carthage & Northwestern.

Arrangements are being made by the present owners to extend this road from the present terminus at Brownsville, Kan., westward 25 miles to Oswego.

#### Union Pacific.

The company will take an appeal to the United States Supreme Court from the decision of the Circuit Court that the terminus of the road is on the Iowa side of the Missouri. Meanwhile all trains will be made up on the Iowa side of the bridge, in compliance with the decision.

#### Chicago, Rock Island & Pacific.

Mr. George E. Weir, Car Accountant, furnishes us with the following statement of freight-car mileage on that road for the year ending March 31:

Description of car.	Total number of miles.		Average per car.		Average per car per day.	
	1874-75.	1873-74.	1874-75.	1873-74.	1874-75.	1873-74.
Flat cars.....	4,479,554	4,496,060	4,935	5,258	16	15
Stock cars.....	9,448,705	8,759,692	16,235	15,025	52	48
Box cars.....	13,216,727	25,108,965	8,437	11,517	27	36
C., M. I. & P. cars on other roads.....	2,464,560	2,854,799	.....	.....	.....	.....
C., M. I. & P. line cars.....	2,915,853	3,674,450	18,005	22,682	57	72
Totals.....	37,525,400	44,893,976	9,874	11,784	31	38

The decrease for the last year was 7,368,567 miles, or 16.4 per cent.

The mileage of foreign cars over the road for the year was: 1874-75, 9,288,993; 1873-74, 6,459,765; increase, 2,829,228 miles, or 43.8 per cent.

The largest run made during the year was by stock car No. 4,214, which ran 25,582 miles, being an average of 70 miles per day, including Sundays.

The town of Oskaloosa has subscribed the amount asked for by the company to secure the extension of the Sigourney Branch to that place.

It is reported that, in order to build this extension and other proposed works, the company will issue 10 year 7 per cent. income bonds, one-tenth of the issue to be retired annually.

The company has let to F. W. Morris & Co., of Joliet, a contract for grading 12 miles of second track between Joliet and Morris. The work is to be done this summer.

#### Grand Rapids, Newaygo & Lake Shore.

The Grand Rapids (Mich.) Eagle says: "The work of extending the Grand Rapids, Newaygo & Lake Shore Railroad from Newaygo on the Muskegon River to Morgan, a station on the Big Rapids & Muskegon Railroad, and also on the White River, is already begun. The distance from Newaygo to Morgan is 10 miles. The contract to clear the road-bed, grade it and tie it, the whole distance, has been let to Mr. A. Bradford, of Sparta, who already has a large force of men and teams at work on the

job. The bridges, which will be numerous at each end of the 10 miles, and quite expensive, will be built by day's work, President Clay obtaining the foremen and keeping the work under his own supervision. He has already purchased the iron for the track of the Cleveland Rolling Mills, and it will be delivered here as fast as it is wanted."

#### Rusk.

This railroad is now complete from Rusk, Tex., northwest to the International & Great Northern at Jacksonville, and regular trains are running. It is about 12 miles long, is a light, cheap road, following nearly the surface grades, and is worked with a small engine.

#### Burlington, Cedar Rapids & Minnesota.

It is reported that on application of some of the bondholders this road has been put into the hands of a receiver, and that Mr. W. W. Walker, Superintendent of the road, has been appointed to that position.

#### Southern Central.

It is said that this company has closed a contract with the Rome, Watertown & Ogdensburg Railroad Company to deliver 20,000 tons of Shadrer coal for their engines as wanted. This traffic makes quite an item of new business for the Southern Central, which already has a contract to draw 50,000 tons of coal for the New York Central.

#### Washington City, Virginia Midland & Great Southern.

This company has begun running through cars from Baltimore to New Orleans, by way of Chattanooga. A car hoist has been built at Lynchburg, by which cars can be transferred from the 5 feet to the 4 feet 8½ inches trucks in a very short time.

#### Kent County.

It is stated that the trains on this road will shortly cease running over the Townsend Branch from Massey's to Townsend, and will make connection with the Delaware road by passing over the Smyrna & Delaware Bay road from Massey's to Clayton, nine miles.

#### Seoto Valley.

The contract for the construction of this road from Columbus, O., to Portsmouth has been let to George D. Chapman. Work is not to commence till the full amount of \$500,000 is subscribed, but when once commenced the road is to be completed in one year.

#### St. Paul & Pacific.

The St. Vincent Extension is being put in order and trains have begun running for the summer from the Northern Pacific at Glyndon to Crookston, where connection is made with the Red River steamboats.

#### St. Cloud & St. Peter.

Work is to be begun shortly on the section from Litchfield, Minn., to Hutchinson, which is 20 miles long.

#### Indianapolis, Bloomington & Western.

This company's road ends at Pekin, and it uses from that point to Peoria, 10 miles, the Peoria & Springfield road. This 10 miles is the only part of the Peoria & Springfield road that was ever built, and it has been leased to this company ever since it was finished. Recently the Peoria & Springfield Company leased to the Toledo, Wabash & Western the right to run trains over its road into Peoria, but the Bloomington people objected, and refused to give up the road or allow the Wabash trains to run. Actual violence was used to retain possession. An injunction was procured to prevent them from obstructing the Peoria Company in the possession of its road, but it was disregarded, and several of the Bloomington people were consequently arrested for contempt of court.

#### Chicago, Clinton & Western.

At a meeting held recently in Iowa City, Ia., the board voted to annul the contract with Mr. Hinckley, on the ground that he had failed to comply with the conditions of the extended contract. It is thought that this action will result in a law-suit.

#### Rochester & State Line.

At a meeting held in Rochester, N. Y., last week, which was composed of the directors of the railroad, commissioners of bonded towns, and the aldermen of Rochester, a committee was appointed to consider the proposed exchange of bonds, and to decide upon security for the completion of the road in case the exchange should be effected.

#### Maine Railroad Taxation.

The Boston & Maine, the Portland, Saco & Portsmouth, the Portsmouth, Great Falls & Conway, and the St. Croix and Penobscot companies have paid up their taxes for 1874 under the new law. The Maine Central, the Dexter & Newport and the Atlantic & St. Lawrence companies resist payment, claiming exemption under their charters. A decision of the Supreme Court will be needed to settle the question.

#### Utica, Ithaca & Elmira.

This company, in case it completes the proposed purchase of the Auburn Branch of the Midland, intends to take up the rails from De Ruyter to the Otsego trestle, and with them make connection with the Syracuse and Chenango road, at Shed's Corners, and by this with the Central. It is possible that the line from Otsego to Norwich may be retained as a branch.

#### St. Louis & Southeastern.

In the suit of Geo. Opdyke et al. against the Evansville, Henderson & Nashville Railroad, the argument relative to the jurisdiction of the court in the appointment of a receiver was closed at Louisville last week. A motion was made by the receiver appointed by the Henderson Court to compel the receiver appointed by Judge Ballard to turn over everything in his possession, pertaining to the road, to him. The court took the matter under advisement, but intimated that it would not recognize the jurisdiction of the Henderson Court in appointing the receiver.

#### Meetings.

The following companies will hold their annual meetings at the times and places given:

Flushing, North Shore & Central, at the office, No. 13 Mercer street, New York, May 31, at 12 noon.

Chicago, Milwaukee & St. Paul, in Milwaukee, Wis., June 12.

Cairo & St. Louis, at the depot in East St. Louis, June 28, at 11 a. m.

Baltimore & Drum Point, in Baltimore, June 2.

#### Northern Pacific.

The committee of bondholders has prepared a report, in which, after rehearsing the proceedings for foreclosure and sale of the road, they recommend that a committee of six be appointed to buy in the property for the benefit of the bondholders, to operate it provisionally and to organize a new corporation. The plan of reorganization includes the issue of common stock for the present stock; the exchange of the \$51,000,000 outstanding bonds for 8 per cent. preferred stock, to be receivable in exchange for land as the bonds are now. A new first mortgage, not to exceed \$25,000 per mile, is then to be put on the road and used for completing it.

The names recommended for the reorganizing committee of six are Frederick Billings, Woodstock, Vt.; George Stark, Boston; Johnston Livingston, New York; J. N. Hutchinson, Philadelphia; John M. Denison, Baltimore; William Thaw, Pittsburgh.

It is evident that the proceedings thus far have been mainly

in the interest of the parties who have built and managed the road, and that the great body of the bondholders have had nothing to say. The latter are so widely scattered that it would probably be difficult to get any general expression of opinion.

#### New Haven, Middletown & Willimantic.

The first-mortgage bondholders have petitioned the Connecticut Legislature to be incorporated as a company under the title of the Boston & New York Air Line Railroad Company. If duly authorized they purpose to issue \$3,000,000 7 per cent. preferred stock, to be exchanged for the first-mortgage bonds; \$1,000,000 common stock to replace so much of the second-mortgage as is held by the towns which issued bonds in aid of the road, and \$2,000,000 new mortgage bonds, of which \$500,000 will be issued at once to provide means for putting the road in order and equipping it. The remaining \$1,500,000 not to be issued except by authority of three-fourths of the stock. Most of the towns concerned concur in the petition.

#### Panama.

The company has rejected the contract which was partly concluded with the Pacific Mail Company some weeks ago, and declines to enter into any further negotiations for a special contract. The company, it is said, purposes establishing a steamship line of its own from New York to Aspinwall, to connect with its Central American lines.

#### Pennsylvania-New York Division.

For the past month negotiations have been going on with regard to the sending of a mail from New York to Philadelphia on the newspaper train which reaches the latter city a little before 7 o'clock every morning. The company's final answer, however, was that no public train was run at that hour, the newspaper train being run for the Adams Express Company, which controls everything carried upon it, the railroad company furnishing only an engine and the use of the track. The company declines to carry a mail unless paid for special train service, which the Post-office Department has no authority to do.

This newspaper train, as now run, consists of an engine, one express and one passenger car, and makes the run of 90 miles in two hours, or a few minutes over, leaving Jersey City about 4:30 a. m., as the papers are received. Two stops are made, at Newark and Trenton, the bundles of papers for other places being thrown out as the train passes without stopping. It is said that it carries on an average about 30,000 papers daily, of which no less than 14,000 are left at Newark and a large number at other towns and cities along the road, much less than half of the whole number going through to Philadelphia.

#### Erie.

It is stated from London that the London Banking Association denies that it is indebted to the company as stated in Mr. Jewett's report. The Erie Company has put the matter in the hands of Mr. Hugh McCulloch, with instructions to bring suit for the balance due if the matter cannot be amicably arranged.

A private meeting of stockholders was held in New York, May 22, and after some discussion resolutions were adopted to the effect that the borrowing of money by the sale of 7 per cent. bonds, at 40 cents on the dollar, and the other means adopted to raise money, would inevitably result in bankruptcy; that sound policy would require that the money needed to pay interest should be raised by an assessment on the stockholders. The directors were requested to open books of subscription and invite stockholders to contribute voluntarily a sum sufficient to keep the company from going to protest. This proposition is not generally considered practicable.

#### Macon & Brunswick.

The United States Circuit Court, after hearing argument on the petition of John P. Branch, of Virginia, has refused to grant any injunction against the sale of this road, and has also refused his application for the appointment of a receiver.

#### Chicago, Danville & Vincennes.

After hearing arguments on behalf of all the parties in interest, the United States Circuit Court finally decided to remove Messrs. Brown and Hammond, the receivers appointed by the Illinois Circuit Court, and to appoint a person entirely disinterested in the matter. The new receiver selected is Gen. A. Anderson, formerly Vice-President and the chief executive officer of the Toledo, Wabash & Western road.

In making the order of removal the Court says that no reflection on the former receivers or the management is intended, but that it is deemed best to make a change, owing to the differences among the creditors and the fact that the original appointment by the State Court was made without due notice to the bondholders and other creditors.

Gen. Anderson is a well known railroad man of good reputation, and his appointment is understood to be satisfactory to all the parties honestly interested in the case.

#### Danville, Hazleton & Wilkesbarre.

This railroad is advertised for sale on the 15th of June, on liens anterior to the first mortgage on the property. Efforts are making to raise the amount of these liens, and thus save the property from sale.

#### Lancaster & Reading.

The Quarryville Branch, which is probably the only part of the road that will ever be built, has been formally opened for travel. It extends from Lancaster, Pa., southeast 15 miles to Quarryville, Pa. It is worked under lease by the Philadelphia & Reading Company.

#### Hanover & York.

The track is laid from Hanover, Pa., northeast to Spring Forge, nine miles, and on the York end from York southward five miles, leaving about four miles yet to lay.

#### Boston & Albany.

The Massachusetts Legislature finally (in the Senate) rejected the resolutions instructing the State directors to follow a certain line of policy and to make an annual report to the Legislature.

#### Housatonic.

This company has decided to use hereafter only steel rails in renewals of track.

The company has made arrangements for carrying freights in connection with the Rhinebeck & Connecticut and the Connecticut Western roads. It is beginning to compete with the Boston & Albany on some classes of freight for the business of the manufacturing towns of Berkshire County.

#### Missouri, Kansas & Texas.

At the annual meeting in Parsons, May 19, an entirely new board was elected as the result of an agreement between the first-mortgage bondholders, the creditors and the stockholders. The old management, which has thus far controlled the stock, was represented by Mr. Francis Skiddy and voted for the new board. It is understood that Mr. Carr, of the Kansas Pacific, will be President, and other changes are reported as about to take place.

#### Kentucky Central.

The particulars of the compromise between this company and the other parties to the suit for the possession of the old Covington & Lexington road are as follows:

The two parties to the suit unite in forming a new company; the bonded indebtedness (\$1,081,000) of course remains, and the new company will issue \$500,000 preferred and \$4,500,000 common stock. Of the preferred stock \$200,000 will be issued to the city of Covington, \$100,000 to Cincinnati, \$50,000 to Pen-



deletions, and \$150,000 to income bondholders, exclusive of the bonds held by the Bowler estate. Of the common stock, \$1,000,000 will be issued to the stockholders of the present company; \$1,000,000 to the attorneys in the suit and to the stockholders who advanced money for legal expenses; \$100,000 to pay expenses of reorganization and sundry debts, and the balance, \$2,400,000, to the Bowler heirs, who have been contesting the possession of the road. This ends an expensive and apparently interminable law suit.

#### Logansport, Crawfordville & Southwestern.

A meeting of the bondholders was held in New York, May 24, when a committee, consisting of John E. Ward, John Baird and Simon Fitch, was appointed to investigate the present condition of the road; to ascertain, if possible, its original cost; to find the full amount of the liabilities, and the amount it will require to put it in good order. The committee was authorized to make an assessment of \$1 per bond for necessary expenses.

It is charged that the road is an expensive one to work, owing to its heavy grades; that it was badly located; that the light rails used (45 lbs. per yard) are being rapidly destroyed, and that the legal proceedings have been unduly protracted.

#### Oswego Railroad Bridge.

This company invites proposals for building the masonry for its bridge over the Oswego River, at Oswego, N. Y. Proposals will be received until June 10, and plans and specifications may be seen at the office of the engineer, Mr. James K. Ford, at Oswego, N. Y.

We believe that the bridge is intended to connect the Rome, Watertown & Ogdensburg road with its new Lake Ontario Division.

#### New Jersey Midland.

The Receiver, Mr. G. A. Hobart, informs us that he has no power or orders to dispose of any money received from the operation of the New Jersey Midland road except for the payment of running expenses. If there should be any surplus in his hands, the Court of Chancery would order its payment where it ought to be applied. As there is not likely to be any such surplus in the immediate future, he can say definitely that there will be no payment of interest on the funded coupons.

#### Mexican Railroad Affairs.

A telegram from Mexico says that Congress has granted a concession for a railroad from the Gulf of California at Guaymas northward to the California line; also that it is considered probable that Mr. Plumb's contract for the International Railroad (entered into last December by the Administration) will be ratified by Congress.

The railroad from Merida to Progreso, in Yucatan (only a few miles long) is in course of construction.

#### Northern Pacific.

Notice has been given that all holders of claims of any of the classes embraced in the order of sale, and all holders of bonds must appear in person or by attorney before Kenneth G. White, Master in the case, at the United States Court Building in New York, on any business day between July 1 and July 15 next, and make satisfactory proof of their claims or bonds, in order that they may be reported to the Court.

#### Oil Creek & Allegheny River.

The foreclosure sale of this road, which was to have taken place May 15, has been postponed to June 12.

#### Lucas Sleeping Car Company.

A company under this name is being organized in Atlanta, Ga., to run lines of sleeping cars in opposition to the Pullman Southern Car Company. Mr. W. M. Wadley, President of the Central of Georgia, is one of the principal movers in the matter. The new organization has grown out of the feeling caused by the Pullman Company's prompt compliance with the Civil Rights law and its orders to its conductors to admit colored persons to its cars.

#### Georgia.

At the annual meeting in Atlanta, May 13, there was much discussion as to the company's endorsements on Port Royal and Western (of Alabama) bonds. Finally it was resolved (under protest) that the enabling act of Feb. 27, 1875, and the question of the purchase of the Western Railroad, either separately or jointly with the Central Company, be referred to the board of directors, with power to act.

#### Blue Ridge.

The United States Circuit Court at Charleston has given its decision in the suit of J. P. Southern, G. W. Williams and J. P. Law, assignees in bankruptcy of this company, against the Comptroller-General of South Carolina and others. The case involved the validity of \$1,800,000 revenue bond scrip issued by the State in aid of the road and commonly known as Blue Ridge scrip. The assignees sought to compel the State officers to recognize its validity and receive it for taxes, etc. The Court held that a bill in equity would not lie against the State officers to compel a performance of a contract made by the State. The State itself must be a party, but the Court could not compel it to become so. The Court also held that the rights of the parties had been determined in the suit in the State Court.

#### Shenandoah Valley.

It will be remembered that at the recent annual meeting there was a discussion which ended in the accession of a part of the stockholders and the election of two boards of directors. The matter has been settled by a compromise, both boards resigning, and the stockholders met in Winchester, Va., last week and elected a new board.

#### Poughkeepsie & Eastern.

The bondholders who bought this road at the foreclosure sale have organized a new company under the name of the Poughkeepsie, Hartford & Boston Railroad Company.

#### The Hoosac Tunnel Line.

The Massachusetts Legislature, before adjourning, finally rejected the Massachusetts Western consolidated line bill, appropriated \$1,900,000 to complete the work on the tunnel and the Troy & Greenfield road and \$131,000 for the claims of the Shanty Brothers for extra work on the tunnel contract. The full amount of their claim was about \$226,000.

The Boston Advertiser says: "Mr. Prescott, the new Manager of the Troy & Greenfield Railroad and Hoosac Tunnel, will enter upon his duties with a practical knowledge of the details and experience in general railroad business which will be of much value. The power given the Manager under the act is limited in many ways. The Governor and Council are the power upon the throne, and there is no power behind them. The Manager is simply their agent for certain defined purposes and no others. Nevertheless, there is important work to be done with the road, and it depends much more upon the personal energy and intelligence of those who have it in hand than upon acts of the Legislature, whether it is well done or not. The building up of a strong through line, by which alone the tunnel can be made valuable to the State, is evidently to be a work of slow growth. But it is one of the things certain to be accomplished some time, and the management, even on the limited scale now provided for, may do much toward bringing it forward."

The Springfield Republican says: "Herman Haupt & Co., the old Troy & Greenfield Railroad contractors—backed by whom?"

have shown their hand partially. They are asking the Franklin and Berkshire towns to surrender to the old Railroad Company, or, in short, to Mr. Haupt and his supporters, the bonds which these towns hold as security for their subscription to the stock of the company. The towns are also asked to appoint delegates to represent them in the meeting of the stockholders of the Troy & Greenfield Railroad at Boston on the 26th. Williamson will hold a town meeting about both matters on Saturday."

#### Chicago & Lake Huron.

The employees in the shops at Battle Creek, Mich., stopped work May 19, and at the same time all the other employees on the Eastern Division, from Lansing to Valparaiso, gave notice that they would cease work May 24. The men have not been paid since February 1, making four months' wages now due them.

#### Freight Rates from Chicago to the South.

The new tariff adopted by the Illinois Central Company and the Green Line is as follows from Chicago to the leading Southern points, the rate given being per 100 pounds, except flour, which is per barrel:

CHICAGO TO	First class.	Second class.	Third class.	Fourth class.	Fifth class.	Bacon, packed.	Bulk meats, in car-lots.	Grain, in car-lots.	Flour, in sacks.	Flour and corn meal.
Atlanta, Ga.	1.54	1.30	1.07	0.87	0.65	0.67	0.57	0.55	0.70	1.30
Augusta, Ga.	1.60	1.36	1.12	0.74	0.64	0.74	0.64	0.64	0.69	1.28
Birmingham, Ala.	1.51	1.27	1.04	0.82	0.57	0.82	0.92	0.67	0.64	1.20
Brunswick, Ga.	1.51	1.28	1.06	0.53	0.53	0.53	0.53	0.53	0.56	1.06
Charleston, S. C.	1.51	1.28	1.06	0.53	0.53	0.53	0.53	0.53	0.56	1.06
Chattanooga, Tenn.	1.30	1.08	0.86	0.65	0.54	0.65	0.65	0.54	0.57	1.03
Eufaula, Ala.	1.82	1.51	1.25	0.57	0.74	0.89	0.89	0.74	0.80	1.48
Macon, Ga.	1.79	1.49	1.24	0.78	0.72	0.71	0.71	0.72	0.77	1.44
Montgomery, Ala.	1.51	1.27	1.04	0.70	0.69	0.70	0.70	0.69	0.63	1.18
Nashville, Tenn.	0.85	0.70	0.54	0.38	0.38	0.38	0.38	0.38	0.38	0.74
Opelika, Ala.	1.82	1.51	1.25	0.87	0.74	0.88	0.88	0.74	0.80	1.48
Pensacola, Fla.	1.51	1.26	1.04	0.70	0.69	0.70	0.70	0.69	0.63	1.18
Port Royal, S. C.	1.51	1.28	1.06	0.53	0.53	0.53	0.53	0.53	0.56	1.06
Savannah, Ga.	1.51	1.28	1.06	0.53	0.53	0.53	0.53	0.53	0.56	1.06
Selma, Ala.	1.51	1.26	1.04	0.70	0.69	0.70	0.70	0.69	0.63	1.18
Spartanburg, S. C.	2.19	1.81	1.52	0.95	0.88	0.95	0.95	0.88	0.97	1.70

The war between the Green Line companies and the St. Louis & Southeastern continues sharp, and it is reported that the latter company will be charged local rates from Nashville on freights sent over its line from St. Louis to points south of Nashville.

#### RAILROAD LAW.

##### Michigan Railroad Laws.

The Lansing Republican gives the following summary of laws relating to railroads which were passed by the Michigan Legislature at its recent session:

"Senate bill 25 amends act No. 79 of the session laws of 1873, known as the Railroad Commissioner act. While compelling railroad companies to draw their cars than their own, it releases them from the obligation of drawing the cars of car-loading companies, fast freight lines, and other organizations not legitimately connected with railroads in this State. This bill also imposes a penalty for neglect on the part of flagmen to display proper signals at street crossings.

"House bill 93 amends the general law by providing that the name of each station is to be announced twice within each passenger-car, the doors of the car being closed at the time of the announcement. At junctions, crossings, and points where trains leave in different directions at or near the same time, the conductor of each train shall cause to be announced from each car of his train the direction in which that train is to go. The wording of the section relative to the use of air-brakes on passenger trains is so changed as to leave no loopholes by which its provisions can be avoided. Railroad companies are required to furnish to their employees of every grade copies of the rules relative to their respective duties, and a penalty is affixed for their violation knowingly. The signals at highway crossings are the whistle twice sharply sounded at least 40 rods before the crossing is reached, and the continuous ringing of the bell until after the crossing is passed. The section relative to fences is so amended that any person who shall intentionally permit any animal within the fences, other than at farm crossings, or shall make openings through such fences, cattle-guards or ditches, or neglect to close any gates or bars immediately after passing through the same, is made liable to a severe penalty.

"Senate bill 151 amends the general law relative to the crimes of burglary and larceny so as to include railroad cars among the places into which it is a crime to break. It also provides that any person who shall unlawfully break into any freight car, or enter the same without breaking, with intent to obtain carriage, the same being a part of the freight train, is liable to the usual penalties for misdemeanors.

"Senate bill 47 authorizes any railroad company in the State to construct or use, for the transportation of passengers, such sleeping-cars, parlor-cars, or chair-cars as they may desire, and may make such reasonable rules and regulations concerning their use as it may deem proper. But the providing of such cars does not release any railroad company from furnishing first-class passenger cars for the use of the public, at the regular passenger fares now fixed by law.

"House bill 281 requires every railroad corporation doing business in the State to cause immediate notice of any accident which may occur on its road, attended with loss of life, to a coroner of the county residing nearest to the place of accident, and also to give notice of such accident to the Railroad Commissioner. This bill also makes it the duty of the Railroad Commissioner to investigate the causes of accidents resulting in loss of life, when he may deem it necessary.

"House bill 91 prohibits railroad companies from using naphtha, or any product of coal oil or petroleum, for lighting passenger-cars. The penalty for a violation of this act is \$500.

"House bill 123 authorizes railroad companies to cut any tree or trees that are dangerous, and liable to fall on their track.

"Senate bill 193 authorizes railroad companies to regulate the sale of tickets at special rates. The terms are to be plainly printed on such tickets, and the holder is not entitled to ride in any train not designated by the tickets, nor at any time beyond that stipulated in the agreement.

"Senate bill 192 repeals an act of 1871 relative to the transportation of freight and passengers and the management of railroads in this State not incorporated under the general law. Part of this law was inoperative because it attempted to deal with chartered roads, while the only provisions of any value were incorporated in the law of 1873."

##### Iowa Railroad Law.

The United States Circuit Court has given its decision refusing to grant the injunction asked for by the Burlington & Missouri River Company to prevent the enforcement of the law

regulating rates. The grounds of the decision are that the State never conferred upon the company the exclusive right to fix its own tolls, and, if it had done so, the right was surrendered when the company accepted the land grant from the State. The fact that railroads are owned by private parties does not divest them of their character as highways, or the State of its general control and power to make police regulations.

The Court allowed an appeal to the Supreme Court of the United States.

#### The New York Rapid Transit Law.

The New York Tribune gives the following summary of the provisions of this law, which is intended to make it possible to build a city steam railroad if a company will raise money enough. The other provision made by the late Legislature was a law enabling the New York Elevated Company to extend its road, now in successful operation from the Battery to Thirty-fourth street, northward to the Harlem River. The Governor has not yet passed on either of these bills:

"The Act which has been passed is of course a general one, though for the present its interest is solely for the metropolis. It provides that on the petition of fifty reputable householders and tax-payers the Mayor may appoint five Commissioners to designate the route for the proposed road, to select a plan, and to fix the rates of fare and freight, the time within which the road is to be constructed, and the amount of the capital stock. The company is to have the right to increase its capital by a two-thirds vote, and to determine the motive power, which, however, must be 'other than animal power.' The commissioners may be removed by the Governor for cause, and the Governor is also to fill vacancies in their Board, caused by death, resignation, or removal."

"In the selection of a route the Commissioners are required to obtain the consent—1. Of 'the local authorities having the control of that portion of a street or highway upon which it is proposed to construct or operate' the railway, which local authorities are, in New York, the Board of Aldermen; and 2. Of the owners of one-half in value of the property bounded on the route; but in case the consent of the property owners cannot be obtained, then three commissioners are to be appointed by the General Term of the Supreme Court, to determine whether the road shall be built on that route nevertheless. Broadway and Fifth avenue, below Fifty-ninth street, Fourth avenue, above Forty-second street, and all public parks are excepted from the routes open to the choice of the Commissioners. No steam railway is to be constructed upon St. Nicholas avenue, or any of the boulevards. With regard to routes previously chosen by existing companies the language of the bill is a little obscure. The Commissioners are expressly prohibited in the 4th section from selecting streets 'already located for or occupied by an elevated or underground railway;' but in Section 36 it is provided that 'whenever the route or routes determined upon by said Commissioners coincide with the route or routes covered by the charter of an existing corporation formed for the purpose provided for by this act, provided that said corporation has not forfeited its charter or failed to comply with the provisions thereof requiring the construction of a road or roads within the time prescribed by its charter, such corporation shall have the power to construct and operate such railway or railways upon fulfillment of the requirements and conditions imposed by said Commissioners as a corporation specially formed under this act.'

#### Railroad Legislation in New York.

At the late session of the New York Legislature, the following acts were passed:

An act relating to the consolidation of certain railroad companies.

An act to amend Chapter 265 of the Laws of 1848, entitled "An act to provide for the incorporation and regulation of telegraph companies," passed April 12, 1848.

An act to authorize the payment, in whole or in part, of the bonded indebtedness of any of the towns in this State created in aid of any railroad therein, and to prescribe the mode in which the people thereof shall determine the time and amount of such payment.

An act further to amend Chapter 346 of the Laws of 1863, entitled, "An act empowering railroad companies to employ police force."

An act to provide for the sale of stock and bonds of bankrupt railroad companies by municipal corporations holding the same, and for the disposition of the proceeds of such stock and bonds.

An act to authorize cities to provide railways for rapid transit of persons and property, and to create corporations for that purpose.

An act to authorize towns, cities and villages to pay their bonds issued for railroad purposes by exchanging them for their railroad stock or bonds, and to exchange their stock of any railroad corporation for the bonds of such corporation.

An act for the better security of railroad employees for labor performed.

#### Travellers' Guide.

In looking up some matters of historical interest we discovered the following Travellers' Guide, which was compiled and published by the New York Herald through the Summer of 1848. In those days there were about 1,200 miles of railroad in Pennsylvania and 953 miles of canal in operation. We have now in Pennsylvania 10,000 miles of railroad, counting main lines and branches.

The old-time guide we fear would prove rather unsatisfactory to the man who, living in Pittsburgh, can now travel to New York, transact business there and be back at home within 30 hours. The old-time traveller doubtless required 24 hours to recover from the fatigues of his journey. On the Pennsylvania Railroad one can now travel from Pittsburgh to New York on the Day Express (444 miles) in 13½ hours, a feat of passenger transportation as yet unparalleled. From New York to New Orleans by the "Piedmont Air Line" the distance is 1,387 miles, and by the "Kennesaw Route," 1,442 miles. By either the time required for the trip is little more than 74 hours. The time required for a trip to Cincinnati from New York, via the Pennsylvania line, is only 29 hours.

Let us now compare the routes followed 26 years ago with our own, and congratulate ourselves on having good tracks and sleeping cars.

##### Pennsylvania Route to New York.

	Miles.
Pittsburgh to Brownsville (steamboat).....	63
Cumberland (stages).....	75-140
Baltimore (railroad).....	175-318
Washington (railroad).....	31-349
Philadelphia (railroad).....	94-412
New York (railroad).....	95-608
Time—Pittsburgh to Baltimore, 34 hours. Fare.....	\$10 00
Washington, 35 hours. ".....	11 25
Philadelphia, 42 hours. ".....	12 00
New York, 50 hours. ".....	15 00

##### Pennsylvania Canal Route.

	Miles.
Pittsburgh to Johnstown (canal).....	103
Holidaysburg (rail).....	37-140
Harrisburg (canal).....	140-280
Philadelphia (railroad).....	107-397
New York (railroad).....	90-443
Time through, 4½ days.	

\*Not quite. From London to Perth Amboy, Scotland, the journey is made by the London & Northwestern and the Caledonian roads in 12½ hours, and the distance is 460 miles.—EDITOR RAILROAD GAZETTE



Fare—Pittsburgh to Philadelphia, \$8. Board \$1 per day....	\$12 00
Philadelphia to Pittsburgh, \$10. " " \$1 per day....	14 00
New York to Pittsburgh.....	17 00

Distances from Cincinnati to Sandusky, Ohio.

To Xenia (by railroad).....	Miles.
" Springfield (by railroad).....	23-87
" Urbana (by stages).....	14-101
" Bellefontaine (by stages).....	17-118
" Kenton (by stages).....	45-143
" Tiffin (by railroad).....	41-184
" Sandusky (by railroad).....	37-221

Time, 1½ day. Fare, \$7.

#### RECAPITULATION.

Chicago & Detroit Route.	Miles.
New Orleans to St. Louis (time 6 days; fare \$16).....	1,090
St. Louis to Chicago (time 3 days; fare \$12).....	390
Chicago to Detroit (time 3 days; fare \$10).....	640
Detroit to Sandusky (time 8 hours; fare \$2).....	75
Sandusky to Buffalo (time 24 hours; fare \$6).....	250
Buffalo to New York (time 2½ days; fare \$13).....	470

Total (time 16 days; fare \$58).....2,915

Great Central United States Mail Route.	Miles.
New Orleans to Cincinnati (time 7 days; fare \$12.50).....	1,424
Cincinnati to Wheeling (time 40 hours; fare \$4).....	355
Wheeling to Baltimore (time 34 hours; fare \$11).....	309
Baltimore to Relay House to Washington City (time 2 hours; fare \$1.25).....	31
Baltimore to Philadelphia (time 8 hours; fare \$2).....	94
Philadelphia to New York (time 8 hours; fare \$3).....	96

Total (time 11 days; fare \$32.50).....2,278

Sandusky and Cincinnati Route.	Miles.
New Orleans to Cincinnati (time 7 days; fare \$12).....	1,424
Cincinnati to Sandusky (1½ day; fare \$7).....	221
Sandusky to Buffalo (time 1 day; fare \$6).....	250
Buffalo to New York (time 2½ days; fare \$13).....	470

Total (time 12 days; fare \$38.50).....2,365

Monongahela Route.	Miles.
New Orleans to Cincinnati (time 7 days; fare \$12.50).....	1,424
Cincinnati to Pittsburgh (time 3 days; fare \$5).....	450
Pittsburgh to Baltimore (time 34 hours; fare \$10).....	318
Baltimore to Washington City (time 2 hours; fare \$1.25).....	36
Baltimore to Philadelphia (time 8 hours; fare \$2).....	94
Philadelphia to New York (time 8 hours; fare \$3).....	96

Total (time 12 days; fare \$33.50).....2,378

Pennsylvania Canal.	Miles.
New Orleans to Cincinnati (time 7 days; fare \$12).....	1,424
Cincinnati to Pittsburgh (time 3 days; fare \$5).....	461
Pittsburgh to Philadelphia (time 4 days; fare \$14).....	387
Philadelphia to New York (time 8 hours; fare \$3).....	96

Total (time 15 days; fare 24.50).....2,358

From Cincinnati to New York by the Great Central United States Mail Route, via Wheeling, distance 854 miles; time 4 days; fare \$20.

From Cincinnati to New York by the Sandusky Route, distance 941 miles; time 5 days; fare \$26.

From Cincinnati to New York by the Monongahela Route, distance 952 miles; time 5 days; fare \$20.

From Cincinnati to New York by the Pennsylvania Canal Route, distance 932 miles; time 8 days; fare \$22.—United States Railroad and Mining Register.

#### Train Accidents in April.

On the morning of the 1st, on the Chicago Division of the Baltimore & Ohio, an express train ran into the rear of a construction train which was standing on the track near St. Joseph, Ind., wrecking several cars, injuring the engineer and fireman of the express and two hands on the other train. The accident is said to have been caused by the neglect of the signal man.

On the 1st, four cars of a freight train on the Mankato Branch of the Winona & St. Peter road were thrown from the track near Winona, Minn., by a dropped brake beam.

On the 2d, several cars of a passenger train on the Chicago, Rock Island & Pacific road ran off the track near Neola, Ia., injuring three passengers.

On the afternoon of the 2d, two cars of a freight train on the Missouri, Iowa & Nebraska road were thrown from the track at Alexandria, Mo., by the spreading of the rails. One of the cars upset and was badly wrecked, killing several cattle.

On the night of the 2d, the milk train on the New Jersey Midland Railroad ran into a land slide near Bloomingdale, N. J., throwing the whole train from the track.

On the morning of the 3d a freight train on the Northern Central road ran into a land slide near Clark's Ferry, Pa., and was thrown from the track, killing a brakeman and injuring the conductor.

Very early on the morning of the 4th, there was a butting collision between two express trains on the Burlington & Missouri River road between Albia and Tyrone, Ia., by which both engines and some cars were badly wrecked. A conductor, an express messenger and one fireman were killed, both engineers, the other fireman and two others badly hurt. The accident was caused by the failure of a telegraph operator to deliver an order.

On the 4th, near North Platte, Neb., on the Union Pacific a passenger train ran over a steer and was thrown from the track, blocking the road a day.

On the morning of the 5th some cars of a coal train on the Erie Railway jumped the track in the Bergen Tunnel, delaying trains some time.

On the 5th a car of a passenger train on the North Pacific Coast road was thrown from the track by a very high wind, near Sawcetto, Cal., and rolled down a high bank, injuring six persons, two of them very badly. The car was much broken.

Early on the morning of the 6th, an extra freight train on the New York Division of the Pennsylvania Railroad stopped at Marion, N. J., to take some cars from a siding, leaving part of the train standing on the main track. A following freight train came up and ran into the rear of these cars, wrecking its own engine and several cars and blocking the track some time. A brakeman was killed and the fireman, who jumped, was injured. The accident is said to have been caused by a telegraph operator who signaled the second train to come on, by mistake.

On the morning of the 6th, a freight train on the Central Pacific broke in two near Kelton, Utah, and the rear section ran into the forward one, wrecking 10 cars and blocking the road four hours.

On the 6th, the baggage car of a train on the Illinois Central road ran off the track in Cairo, Ill., and a truck was broken up.

On the evening of the 6th, there was a butting collision between a north-bound passenger and a south-bound mixed train on the Connecticut Valley road, near Chester, Conn., by which one engine and several cars were wrecked and the other engine somewhat damaged. The accident is said to have been caused by an error in the freight conductor's watch, which led him to believe that he could reach Chester and pass the freight there.

Early on the morning of the 7th, a freight train on the Chicago & Northwestern road was thrown from the track at Lombard, Ill., by a misplaced switch. The engine upset and three cars were badly wrecked. The fireman was seriously hurt.

On the evening of the 7th, on the Belvidere Division of the Pennsylvania Railroad, a train ran into a rock which had rolled upon the track near Bull's Island, N. J. The engine was

thrown from the track and into the Delaware River, and several cars were badly broken.

Very early on the morning of the 8th, a freight train on the Missouri, Kansas & Texas road ran into a culvert which had been washed out during a heavy rain storm, near Colbert, in the Indian Territory. The engine and six cars were badly wrecked, the engineer killed and two men badly hurt.

On the morning of the 8th, a train on the Toledo, Peoria & Warsaw road ran over a cow near Fairbury, Ill., and nine cars were thrown from the track and badly broken, injuring four men on the train.

On the morning of the 9th, on the Chicago & Northwestern road near Chicago, several cars of a freight train were thrown from the track by a dropped brake beam and badly broken up. The track was also torn up, causing considerable delay.

On the afternoon of the 10th, a train on the Belfast Branch of the Maine Central ran into a rock which had fallen on the track in a deep cut near Belfast, Me. The engine was thrown from the track and badly broken.

On the 10th, the engine of a mail train on the Amboy Division of the Pennsylvania Railroad was thrown from the track by a broken rail at the Ash Run marl bed near Vincennes, N. J.

On the morning of the 12th, a passenger train on the Chicago, Rock Island & Pacific road ran off the track near Minooka, Ill.

On the morning of the 13th, two cars of a local freight train on the New York Division of the Pennsylvania Railroad ran off the track at Uniontown, N. J., injuring a brakeman and blocking the road three hours.

On the night of the 13th, nine cars of a freight train on the Chicago, Rock Island & Pacific ran off the track at Four Mile, Ia.

On the night of the 13th, a west-bound freight train on the Baltimore & Ohio ran into a landslide near Board Tree Tunnel, W. Va., and the engine and several cars were thrown from the track and wrecked.

On the morning of the 14th, a train on the St. Louis, Hannibal & Keokuk road was thrown from the track near Frankford, Mo., by a loose rail and a brakeman was killed.

About noon on the 14th, as a freight train on the Quincy, Alton & St. Louis road was pulling into the Quincy (Ill.) yard, three cars were thrown from the track by a loose rail turning over. The road was blocked an hour and a half.

On the 14th, as a freight train on the Quincy, Alton & St. Louis road was switching some cars in Quincy, Ill., several of them were pushed off the end of a siding, delaying the train some time.

On the morning of the 15th, as a passenger train on the Indianapolis, Bloomington & Western road was near Hillsboro, Ind., an axle broke under the passenger car next to the last, and the broken ends caught in the ties, tearing out the trucks from under two cars and throwing the rear one down a bank and into a saw-mill. Four passengers and the conductor were hurt.

On the 15th a passenger train on the Indianapolis, Bloomington & Western ran off the track near Easton, Ill., and the engine upset, injuring the engineer.

On the night of the 15th, a passenger train on the Southwestern Division of the Chicago, Rock Island & Pacific ran into the rear of a freight, which was just going upon a siding near Centerville, Ia. Several cars were wrecked and the road blocked some hours.

Late on the night of the 15th a freight train on the New York Division of the Pennsylvania Railroad ran off the track in the Bergen Cut, N. J., and five cars were badly wrecked, blocking both tracks all night. The accident was caused by a broken axle under a freight car.

On the night of the 16th a freight train on the Michigan Central ran off the track near Geddes, Mich., blocking the road eight hours.

On the night of the 16th there was a butting collision between a freight and a passenger train on the Cleveland, Columbus, Cincinnati & Indianapolis road, near Marysville, O., by which an engine was slightly damaged. The engineer of the passenger reversed his engine and jumped and that train started off backwards and soon attained a high speed. It had run some five miles when the conductor climbed upon it and stopped it.

On the night of the 17th, on the Newburgh Branch of the Erie, near Greycourt, N. Y., there was a butting collision between a freight and a coal train by which both engines and several cars were wrecked. The accident is said to have been caused by one of the conductors, who misunderstood his orders.

On the night of the 17th a train on the Savannah, Skidaway & Seaboard road was thrown from the track in Savannah, Ga., by a misplaced switch, blocking the road some hours.

On the morning of the 18th the engine of a freight train on the Hannibal & St. Joseph road exploded her boiler while the train was standing at St. Catherine, Mo., injuring the engineer and fireman.

Near noon on the 18th, a mixed train on the St. Paul & Sioux City road was thrown from the track near Mankato, Minn., where some sticks of wood had been placed on the track and bedded down between the ties near the end of a trestle, for the purpose of wrecking the train. The engine left the track and ran on the ties upon the trestle, which gave way, and the engine and six cars went down 25 feet and were badly broken, injuring a brakeman and killing over 50 cattle. The caboose and passenger car broke loose and were left on the track. The men who prepared the obstruction were not discovered.

On the evening of the 18th, the sleeping coach of a train on the Niagara Falls Branch of the Erie was thrown from the track in Buffalo, N. Y., by the breaking of a truck.

The rest of the train proceeded, but the engine tender and baggage car were thrown from the track a few minutes later by a misplaced switch at the Buffalo, New York & Philadelphia crossing.

On the night of the 20th, a car of a passenger train on the Louisville, New Albany & Chicago road was thrown from the track near Salem, Ind., by a broken axle.

On the night of the 21st, an east-bound passenger train on the Chicago, Rock Island & Pacific road ran into the head of a west-bound freight which was just going upon a siding at Peru, Ill. An engine and several cars were damaged.

On the night of the 21st, a freight train on the Indianapolis & St. Louis road ran over some horses which had got upon a trestle bridge near Grant, Ind., throwing the engine from the track.

On the morning of the 22d, 15 cars of a freight train on the St. Paul & Sioux City road were thrown from the track near St. James, Minn., by a broken wheel.

On the afternoon of the 23d, the engine of a freight train on the Illinois Central Railroad exploded her boiler when the train was near De Soto, Ill., mortally wounding the fireman and injuring the engineer badly. The engine had stopped to take water from a tank and had just started when the explosion took place.

On the evening of the 23d, near Church Buttes, Wyoming, on the Union Pacific road, an engine and two cars were thrown from the track and into a ditch at a place where the road-bed had been washed out by a freshet.

Very early on the morning of the 23d, five cars of a train on the Grand Trunk Railway ran off the track at the Fish Point Bridge, near Portland, Me., and went down into the water, causing a loss of \$12,000 on cars and merchandise.

On the morning of the 23d, in Nashville, Tenn., a Louisville & Nashville freight train ran off the track, blocking the road some time.

On the 23d, a freight train on the Mercer & Somerset road ran off the track near Pennington, N. J., blocking the road some time.

On the night of the 23d, a freight train on the New York Division of the Pennsylvania road broke in two near Monmouth Junction, N. J., and the rear section afterwards ran into the forward one, breaking several cars and blocking the road some hours.

On the afternoon of the 24th, three cars of a freight train on the Erie Railway ran off the track near Chester, N. Y.

On the night of the 24th, some cars of a freight train on the Erie Railway ran off the track near Rutherford Park, N. J., blocking the road some time.

On the afternoon of the 26th, as the south-bound New York express on the Baltimore and Potomac road was approaching the Eastern Branch Tunnel near Washington, at a high rate of speed, it ran into the head of a north-bound local passenger which had just left the siding at the end of the tunnel. Both engines and four cars were wrecked, the cars being piled up over the engines and tenders and completely broken up. Fifteen persons were severely injured, besides a number slightly. It is charged that the north-bound train should have waited on the tunnel siding until the express had passed and that it left the siding without authority.

On the 27th, a freight train on the European & North American road ran off the track near Bancroft, Me., wrecking two cars, damaging several others and blocking the road four hours.

On the evening of the 27th, the engine of a train on the Indianapolis, Bloomington & Western ran off the track near the depot in Peoria, Ill. One man was hurt.

On the afternoon of the 28th, two cars of a passenger train on the Atlantic & Great Western were thrown from the track near Miller's, Pa., by the spreading of the rails and one of them went into the ditch, injuring three passengers.

On the afternoon of the 29th, two cars of a passenger train on the Painesville & Youngstown road were blown from the track by a high wind and went down a bank 10 feet high. The cars were badly broken, one passenger severely and four slightly hurt.

On the morning of the 30th, on the Galveston, Houston & Henderson road, near Dickinson, Tex., a truck axle broke under the engine of an excursion train, letting the front end of the engine down upon the track and throwing several cars into the ditch. Four persons were hurt.

On the morning of the 30th, there was a butting collision between two freight trains on the Catawissa Division of the Philadelphia & Reading road, by which both engines and a number of cars were badly wrecked, an engineer killed and a conductor badly hurt.

On the night of the 30th, a freight train on the Pennsylvania Railroad broke in two near Kittanning Point, Pa., and the rear section subsequently ran into the forward one, wrecking six cars.

Some time near the end of the month a train on the Texas, Mississippi River & Northwestern road was thrown from the track 14 miles from Chicot, Ark., and badly wrecked. The accident is said to have been caused by the track spreading, the ties being rotten.

This is a total of 60 accidents, whereby nine persons were killed and 67 injured. Seven accidents caused death, 15 others injury but not death, while 38, or 63.3 per cent. of the whole, caused no serious injury to any person. The number of injured is unusually large in proportion to the number of accidents.

These accidents may be classified as to their nature and causes as follows:

COLLISIONS.  
Rear collisions..... 6  
Butting collisions..... 7  
Total..... 13

DERAILMENTS.  
Unexplained..... 15  
Accidental obstruction..... 4  
Spreading of rails..... 4  
Broken axle..... 4  
Misplaced switch..... 3  
Cattle on track..... 3  
Landslide..... 3  
Washout..... 2  
Wind..... 2  
Broken rail..... 1  
Broken wheel..... 1  
Broken truck..... 1  
Running off end of siding..... 1  
Malicious obstruction..... 1

Boiler explosion..... 2  
Total..... 60

Three collisions were caused by the breaking in two of trains, three by the failure to use signals properly and two by misunderstanding of orders. Twenty accidents were caused by defects or failures of road or equipment. The number of unexplained derailments is large, being one-third of the whole number of derailments and one-fourth of all the accidents; without doubt nearly all could be referred to bad track consequent upon the yet unrepaired ravages of the winter. Broken rails have almost disappeared, though there are several broken axles.

Two cases are recorded where cars were thrown from the track by the direct action of the wind; both of them were on roads of 3 feet gauge.

The number of accidents is very small and is in sharp contrast to the heavy record of the first three months of the year. The average of those three months was 155, or more than two and one-half times the number for April. That month, indeed, seems to be a poor—or rather a good—month for accidents, for last year the smallest number for any month in the year were recorded in April. As compared with the same month last year there was an increase of one in the number of accidents; an increase of 6, or 200 per cent., in the number killed, and an increase of 55, or 458.3 per cent., in the number hurt, the list of killed and injured having been very short last April.

For the year ending with April the record is as follows:

	No. of accidents.	Killed.	Injured.
May.....	89	19	81
June.....	83	22	65
July.....	64	20	104
August.....	73	16	77
September.....	60	27	105
October.....	81	16	60
November.....	82	13	69
December.....	74	12	49
January.....	131	10	96
February.....	211	11	186
March.....	122	17	87
April.....	60	9	67

Totals.....1,109  
192  
992

The averages per day for April were 2 accidents, 0.30 killed and 2.23 injured; for the year they were 3.18 accidents, 0.53 killed and 2.72 injured.